Light and Lighting

IX.—No. 8. August, 1936 Price 9

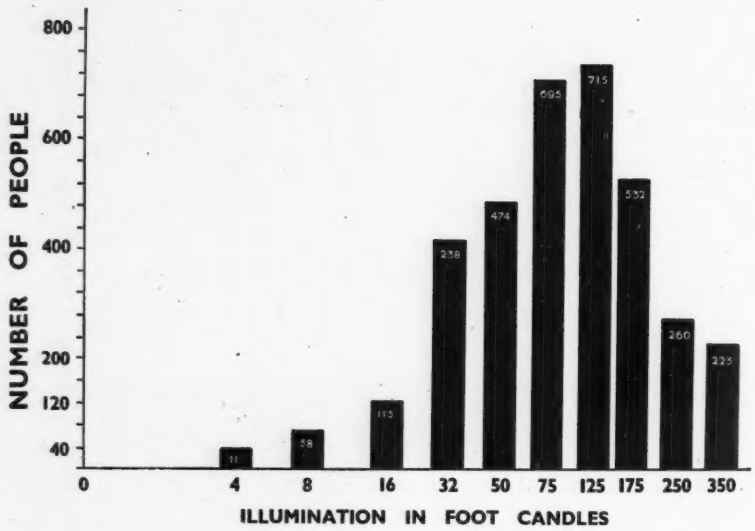
THE SCIENCE OF SEEING

Good lighting brings custom and increased profits to the Hotel Proprietor.

Light provides an added attraction to an hotel, being an important aid to comfort and well-being; in the kitchens it makes cleanliness and greater working efficiency easier to achieve.

CORPORATING "THE ILLUMINATING ENGINEER"

THE SCIENCE OF SEEING



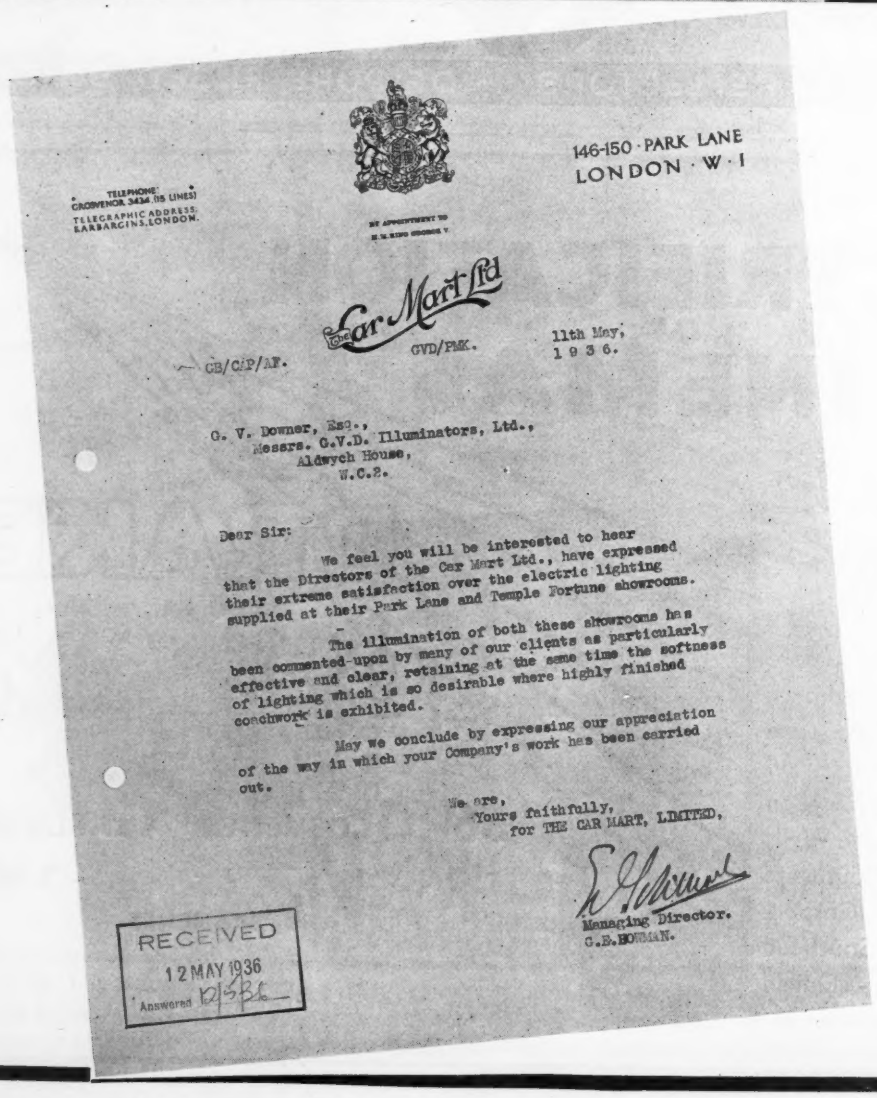
BETTER LIGHT

BETTER SIGHT

A CONVINCING TEST

In order to obtain information on the amount of light required for comfortable seeing, a special demonstration has been devised by E.L.M.A. Lighting Service Bureau in which individuals can, by means of a regulator, vary the illumination falling on an ordinary sheet of newspaper between the limits of 4 and 350 foot candles. Having selected the illumination which enables them to see with comfort, the operating handle is depressed and the machine issues a numbered ticket with the foot candle value chosen stamped clearly upon it. The distribution of the values chosen, shown in the diagram above, is especially interesting, since it indicates clearly that, while there are a few individuals who are content with quite low illumination values, and also a few who require exceptionally high values, the bulk of the people chose values between 50 and 200 foot candles.

Car Mart Ltd., Park Lane, W.



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BY APPOINTMENT TO H.M. KING GEORGE V.

The Car Mart Ltd

GB/CAP/AF. GVD/PMK. 11th May, 1936.

G. V. Downer, Esq.,
Messrs. G.V.D. Illuminators, Ltd.,
Aldwych House,
W.C.2.

Dear Sir:

We feel you will be interested to hear that the Directors of the Car Mart Ltd., have expressed their extreme satisfaction over the electric lighting supplied at their Park Lane and Temple Fortune showrooms.

The illumination of both these showrooms has been commented upon by many of our clients as particularly effective and clear, retaining at the same time the softness of lighting which is so desirable where highly finished coachwork is exhibited.

May we conclude by expressing our appreciation of the way in which your Company's work has been carried out.

We are,
Yours faithfully,
for THE CAR MART, LIMITED,

Managing Director.
G.E.HOWMAN.

RECEIVED
12 MAY 1936
Answered 12/5/36

It is obvious that, whatever may be claimed for G.V.D. lighting, the System ultimately stands or falls on performance.

Here is another valued tribute to G.V.D. lighting —*and* G.V.D. service.

This night photograph gives a fair indication of the remarkably even distribution of light. Each of the ceiling units, which are 17 ft. above floor level, contains a single 200 watt lamp. May G.V.D. co-operate with *you?*

G.V.D.
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ALDWYCH HOUSE
LONDON, W.C.2
Holborn - 7277-8

Incorporating "The Illuminating Engineer."

Light and Lighting

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Vol. XXIX.—No. 8 **August, 1936** PRICE NINEPENCE Subscription 10/6 per annum, post free

Principal Contents:

The Administration of Electric Supply

WE are concerned with the Cause of Better Lighting —not with the generation and distribution of gas or electricity.

But some of the conditions described in the recently issued Report of the Committee on Electricity Distribution do not help Good Lighting.

Observe the troublesome variations in system (direct or alternating current) and the fact that as many as 43 different declared voltages ranging between 100 and 480 volts are in use.

Look at the multiplicity of supply undertakings. There are over 600 in the British Isles and 82 in London and the Home Counties alone, operating under 243 separate Acts of Parliament.

The extraordinary variety of methods of charging in different areas is regarded by the Committee as "one of the most pressing matters which call for reform."

If consumers are to spend generously on lighting they must be assured of two things; a reasonable low rate per unit (the Committee consider ½d. per unit feasible) and certainty that this rate, once granted for lighting, will be maintained.

The Committee emphasise the fact that legislative powers are necessary if a reasonable degree of uniformity throughout the country is to be secured. Until this happy condition is obtained lighting suffers.

Burford Lodge—Women and Home Lighting—Avenues of Poles—Ultra Violet Light for Sterilisation—Floodlighting London University's New Building—Control Lights for Dentists—Trunk Roads under the M.O.T.

Burford Lodge

Probably not a few of our readers are familiar with the pleasant valley scenery of Burford, under the slopes of Box Hill, and have caught a glimpse of Burford Lodge and its charming grounds. It is reassuring to learn that they are not to be built upon. The house and grounds have been acquired by the London and Home Counties Joint Electricity Authority. The mansion is to be converted into a centre for demonstrations of the uses of electricity. Rooms will be allotted to testing operations and office work, and the greenhouses will be used for experiments in electrical horticulture. An adjacent meadow is to serve as a sports ground for the Staff Sports and Social Association. The centre was formally inaugurated by Lady Brooke on July 4.

Women and Home Lighting

We notice that, according to the Transactions of the American Illuminating Engineering Society, the Women's Auxiliary in Chicago recently co-operated with the Chicago Lighting Institute in a Conference on Home Lighting. Addresses were given by lighting experts and members of the women's organisation, demonstrations of modern methods of lighting were arranged, and a dinner and dance made an agreeable wind-up. There does seem an opening for similar effort in this country. We are not unmindful of the excellent work of the E.A.W., but lighting naturally forms only a part of its broad field of activities, which, of course, are exclusively electrical. Opportunities for the ladies to study and discuss illumination on the impartial lines pursued by the Illuminating Engineering Society might well be provided—possibly through the formation of an informal section— for their special benefit. Apart from the fact that certain fields, such as domestic and school lighting, are of special interest to the ladies, the number of them who hold positions in the lighting industry is steadily growing.

I.E.S. Vacation Activities

Although the Illuminating Engineering Society is now in vacation, it should not be assumed that "all the wheels stop." On the contrary, some continue to turn busily. We understand that there has been an unusually good influx of applications for membership during the summer period. Members, however, even during the holiday season, should not forget their obligations in this respect—nor neglect any opportunity of offering papers or exhibits for the next session, for which preparations are now in hand.

Mr. A. P. Trotter Celebrates His Golden Wedding

A short time ago Professor Teichmüller in Germany was the recipient of congratulations on attaining his seventieth year. The recent announcement in "The Times" of the celebration of his Golden Wedding will have reminded readers that in Mr. A. P. Trotter the Illuminating Engineering Society has a member likewise eminent for his photometric researches, but even more time honoured. Mr. Trotter, who will next year celebrate his eightieth birthday, was married on June 30, 1886, and was born in 1857! He has been responsible for much pioneering work in illumination photometry, and his early researches on prismatic glassware were much in advance of the times. He has been prominently identified with the work of the Society since its foundation, and became President in 1917. During the war he presided over and actively aided a committee of the Society engaged in special experimental work for the Ministry of Munitions. He took a leading part in the formation of the Illumination Research Committee, still operating under the Department of Scientific and Industrial Research. In his retirement near Salisbury Mr. Trotter is still in vigorous health—of which we receive from time to time a pleasant reminder when some statement of interest in this journal attracts his attention. Readers will join us in offering Mr. and Mrs. Trotter congratulations on their Golden Jubilee, and the best of good wishes for years to come.

Avenues of Poles

A correspondent in "Municipal Engineering" has been complaining of the "avenues of poles" that decorate so many highways. There are tramway, bus, and lighting standards, restriction and destriction signs, danger signals, telegraph and telephone poles, and bus stop notices—to which may be added telephone kiosks, islands and their posts, and Belisha beacons! Such things do not add to the value of a street as a picture. It is, however, hard to see how these various calls on one's attention can be eliminated. Something might be done by co-operation on the part of the various authorities concerned. A single pole may serve many purposes, though in some instances it tends to resemble a Christmas tree. Lighting units are, of course, often attached to tramway standards. In important city thoroughfares, at least, it is not impossible in the future for diffused lighting from the sides of the street to be so powerful and general as to render street lighting standards unnecessary.

Ultra-Violet Light for Sterilisation

At the recent meeting of the American Institute in New York, Dr. H. C. Rentschler and Dr. R. F. James, who are associated with the Research Laboratories of the Westinghouse Lamp Company, described some applications of a new form of low-pressure mercury vapour lamp specially designed for the emission of short wave radiation. Such tubes, which are one metre long and consume only about 25 watts, are still in the experimental stage but have already been applied to aid sterilisation. It is believed that half a dozen of them arranged above a surgical operating table will suffice to kill such micro-organisms as are likely to be present (even in normally pure air) and to enclose the patient in a mass of sterile atmosphere. This hope seems to have been encouraged by an address recently given before the American Medical Association by Dr. Hart, who has found this device very effective in reducing infections and post-surgical difficulties in clean healing. Similar types of lamps are also being applied to refrigerated food containers, especially those used for storing meat. It is believed that the growth of mould or fungus can thus be checked and that the use of the lamps will make possible a temperature 20° higher than that normally found necessary, without the food suffering in any way.

London University's New Building to be Floodlighted

Some months ago we gave some particulars of the new London University building in Bloomsbury, and remarked that the tower, 209 ft. high, which will be an outstanding landmark, should prove an excellent subject for floodlighting. One is interested to hear, therefore, that the building *is* to be floodlighted, and is being specially designed by the architect, Mr. Charles Holden, with this end in view.

A Pleasing Night Picture

Courtesy, The General Electric Company, Ltd.

Wigan Lane, one of the main roads leading out of Wigan, illuminated by 400-watt Osira Lamps.

Control Lights for Dentists

The application of traffic light signal systems in other fields is not unknown. It has been found useful, for example, in limiting the length of speeches at public meetings. We notice a reference in the daily Press to what is surely a new and original idea —the application of the method in the dental chair! A box containing red, amber, and green lights is placed on the shoulder of the patient, who holds the controlling switch in his hand. He is thus able to signal at once to the dentist whether he should stop, proceed cautiously, or go all out. The idea, it is said, was suggested to a Wolverhampton dentist as a joke, but has been found by him to have a valuable psychological effect. The mere fact that patients know they have the power to check operations when they become too agonising gives confidence—so that in practice the "stop" notice is, in fact, rarely used.

Trunk Roads under the Ministry of Transport

The announcement that all the trunk roads in the country are to be placed under the control of the Ministry of Transport is a most important one. It implies that in future the care of such roads will be a national obligation. We hope and believe that this will apply to the lighting, so that ultimately the inequalities arising from the different methods and resources of local authorities will become a thing of the past. The new condition should at least make it possible for the Ministry to aid expenditure on lighting in difficult cases.

EVERYDAY PHOTOMETRY

(IV) Calculations on the Lumen Method

Strictly speaking, the term "photometry" denotes processes involved in the measurement of light. It may well be regarded, however, as also covering calculations of candlepower and illumination, such as those discussed in the previous article of this series.

In the present article it is proposed to summarise briefly a process widely adopted by illuminating engineers—calculation by the lumen method.

In the early days of illuminating engineering calculations of illumination were usually made by the point-to-point method. The calculation consists in determining the illumination at any particular spot by applying the inverse square law and cosine law, being thus derived from practice in the photometric laboratory, where the surroundings are dark and reflected light can safely be disregarded.

This is the method which is necessarily pursued in streets and open spaces, where sources of light are relatively few and are far distant one from another, and where little assistance in the form of reflection of light from surroundings can usually be obtained. In such cases there is really no alternative owing to the very great variations in illumination encountered. (An average value is not very helpful where the diversity between individual values may be as great as 100 : 1.)

Average Values of Illumination.

In the case of interior lighting, however, the position is different. When established methods of planning such installations are applied, a high degree of uniformity in illumination can be secured, so that all we need to know is the average value of the illumination.

That accurate results can be obtained by the point-to-point method, even in the case of relatively complicated interior lighting installations, was shown in a joint paper read by W. C. Clinton before the Illuminating Engineering Society in 1914.* The method, however, is a laborious one, as one has to determine in turn the effects of individual sources and add the resultant illuminations together. Moreover the effect of reflected light from walls and ceilings is so considerable as to render accurate calculations of this type difficult, especially in view of the fact that sources of to-day (as we have seen in the last of this series of articles) can rarely be regarded as point-sources.

The Lumen Method.

In practice, therefore, one usually proceeds on a somewhat different method, sometimes associated with the names of Cady and Dates, two eminent American illuminating engineers. This so-called lumen method is based on a consideration of the total flux of light emitted in a room, rather than the contributions of individual sources. It assumes that light-sources are assembled on a symmetrical plan, and that the light is evenly distributed on the working plane, but it can be applied to fittings and methods of widely different character. The lumen method is essentially an empiric and approximate one, but it yields results quite near enough for all practical purposes.

Necessary Illumination.

The very first condition to be settled, in judging the requirements of an installation, is the illumination necessary. This may be based on experience, or taken from a recognised series of values such as those recently issued by the Illuminating Engineering Society. If this illumination in foot-candles—assumed to be distributed evenly over the working area—is multiplied by this area in square feet, we know the flux of light in lumens necessary to furnish the "working illumination." Let us call this the "working flux."

If we know the number of lighting units to be installed and the lumens emitted by each, we also know the "total lumens" furnished to the room.

The Utilisation Factor.

The next consideration, and the crucial one in this calculation, is the ratio of working lumens to total lumens. This ratio is termed the "utilisation factor" of an installation. It is influenced by a number of variable factors, so that its accurate determination is a matter of some complexity. But the three main factors are:—

(1) The nature of the distribution of light from the units adopted, i.e., the proportion of the total available light that is directed downwards, sideways, or upwards.

(2) The height of suspension of these units in relation to the dimensions of the room; and

(3) The nature of the decorative scheme, i.e., the reflecting power of walls and ceiling.

For a full analysis of these factors readers cannot do better than consult the appropriate Electric Illumination Handbook issued by the E.L.M.A. Lighting Service Bureau.* They will find that provision is made for item (1) in the form of a table giving values of the "room index" for varying length and width of room and heights of fitting above working plane of from 5 to 30 ft. A second table enables the coefficients of utilisation to be determined from a knowledge of the room index, and of the nature of walls and ceilings—varying from "very light" (70 per cent. reflection factor) to "fairly dark" (25 per cent. reflection factor)—and for different types of fittings (direct, semi-direct, etc., grouped in six distinctive classes).

Even without these tabular data, however, a fair guess at the values of the coefficient might be made if it is remembered that for direct lighting, excluding extreme cases, values ranging from about 0.3 to 0.6 are usual, whilst for indirect lighting about two-thirds of these figures (0.2 to 0.4) might be assumed. In deciding which of this range of values to adopt it should also be remembered that in general the greater the ratio of the height of suspension to the length and width of the room, the lower the utilisation factor; further, that the influence of surroundings, which is relatively small with direct lighting from lamps in open reflectors, becomes much more important with indirect lighting. In the latter case extreme variations in the reflecting power of surroundings may have the effect of doubling the utilisation factor. With intermediate forms of lighting units, such as diffusing globes or semi-indirect units, the effect of surroundings is intermediate in importance.

Mounting Height and Spacing.

Once the utilisation factor has been agreed, we can deduce the total flux necessary to produce the desired working flux. An examination of the plans of the interior will suggest the most convenient distribution of the lighting units and their mounting height. (The decision as to the form of lighting unit to adopt depends on the purpose served by the room and hardly comes within the scope of this article.) Here, again, full "spacing—mounting height" data corresponding to different types of units are presented in the handbook mentioned above. It is useful to note that, with fittings 7½ ft. above the floor, the maximum distance between lighting points may be

* "Illum. Engineer," April, 1914, p. 189.

*Electric Illumination Handbook No. 2D. Illumination Design Data.

approximately equal to the mounting height; whilst, when the height approaches 40 ft. a ratio of approximately 1 to 1.5 is recommended.

There is just one other point in connection with this process that may be pointed out. Strictly speaking, the mounting height, being one of the factors that influence the utilisation factor, must be agreed before this factor can be accurately determined. It may happen, however, that when the calculation has been completed, the "lumens per unit" come out to a figure intermediate between values available in practice. It may, therefore, sometimes be necessary to retrace one's steps and adopt a different mounting height and spacing, so that conditions can be met by selecting lamps of a standard type.

Allowance for Depreciation.

A final consideration is the adoption of a "depreciation factor" to meet the unfortunate tendency of lighting units to deteriorate with time, and likewise to allow for diminution in the reflecting power of adjacent surroundings.

A diminution in efficiency of 30 per cent., corresponding to a depreciation factor of 1.43, is frequently assumed. In modern buildings where periodical cleaning of lamps and fittings is usual, a smaller factor may be allowed; in certain types of factories, however, a drop of 40 per cent. or more is not uncommon.

The full formula, including all the factors mentioned, is as follows:—

$$\text{Lumens required per Fitting} = \frac{\text{Foot-Candles} \times \text{Area per Fitting in sq. ft.} \times \text{Depreciation Factor}}{\text{Co-efficient of Utilisation}}$$

This is equally applicable to gas and electric lighting, provided the requisite data in regard to lighting units are available. The method can also be used with cornice lighting and other modern methods, as Mr. Lingard recently explained to the Illuminating Engineering Society (see p. 242).

National Physical Laboratory Annual Report

On July 1 those who took part in the annual visit to the National Physical Laboratory had an opportunity of inspecting the new photometric building, which was on view to members of the Illuminating Engineering Society on the occasion of their informal visit earlier in the year. This, one of the most interesting developments, will be fully described in the *Transactions* very shortly.

The annual report of the laboratory (containing 250 large pages) shows once more how varied and extensive the work of the N.P.L. has become. Of great interest is the fundamental work in progress on the primary standard of light; small variations still exist and are being explored, but already substantial progress towards agreement in results in different laboratories has been attained. Other features of photometric work are the extending use of photo-electric methods and the manner in which the Purkinje effect (the modern spelling—Purkyně—favoured by the N.P.L. makes the effect appear all the more fearsome) has revived in importance owing to the differences in colour of light furnished by electric discharge lamps. It is remarked that with very small fields of view the effect is non-existent; but, unfortunately, such conditions are unusual in practice, however realisable and convenient in the laboratory.

Other subjects of great importance which the laboratory is studying include the recovery of the eye after exposure to glare, the testing of street lighting installations, and the effect of colour in promoting visibility in street lighting.

The "Illuminated Man"

Visitors to the Great German Hygiene Museum at Dresden are invariably fascinated by the "illuminated man," which was designed to exemplify some of the general facts of human anatomy. Standing on a circular table, about three feet above floor level, the life-sized figure is made of transparent cellulose material, hard and shiny. Inside this external skin

are arranged models of the principal organs, in the natural size, and coloured. They are twenty-two in number.

Corresponding with these twenty-two organs are twenty-two divisions on the rim of the supporting table, each containing a lamp covered with flat ground-glass, and bearing a name of the organ which is illuminated at the moment. Thus twenty-two lamps in the table light up automatically in succession, in a period of about five minutes, giving the name of the organ which is illuminated at the same moment. Then there is a five-minute lapse, when the process begins again. No personal attention is necessary, except to start in the morning and to switch off at night.

I.E.S. Opening Meeting

We learn that the opening meeting of the Illuminating Engineering Society will take place on Tuesday, October 13, when the presidential address will be delivered and the usual display of exhibits illustrating progress in illuminating engineering will be arranged.

The Lighting of Cinemas

Cinema Lighting should be planned to assist the atmosphere of realistic unreality created by the films.

CINEMAS and theatres differ from almost every other form of building in that, from the lighting aspect, natural daylight plays no part and can be ignored. Here it is always night, and here, therefore, is the illuminating engineer's great opportunity.

Cinemas are places of illusion, designed to take their audiences into a land of make-believe, remote from everyday life. The lighting must be planned to assist this atmosphere of realistic unreality. There should be nothing hard about the illumination, which is required for no close application. A soft radiance from indirect lighting, which will in no way destroy the sense of make-believe, with colour-dimmers to produce various effects, is the ideal.

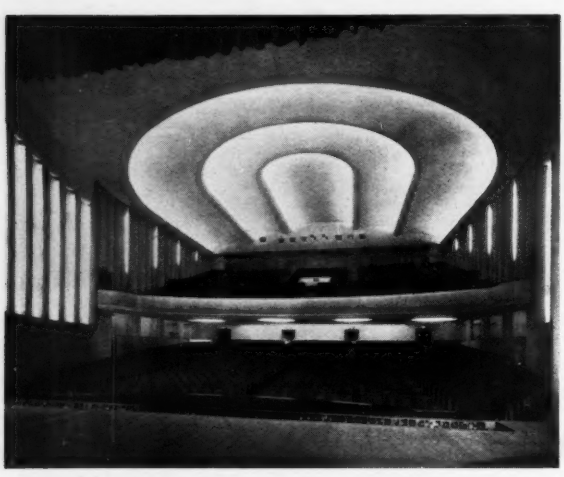


Fig. 1. Indirect lighting of plaster troughing and coves in the Astoria Cinema, Southend.

The installations described in this article are excellent examples of the way in which the art of the illuminating engineer can be adapted to help in creating this atmosphere.

Astoria Cinema, Southend

Figs. 1-3 illustrate the Astoria Cinema, Southend. The lighting in this cinema is entirely indirect, no fittings of any description being visible. The source of illumination in the plaster troughings and coves shown in Fig. 1 consists almost entirely of 25 or 40-watt lamps. The footlights are interesting, and it will be noticed that they are recessed flush with the stage floor level, yet so arranged that the artistes are completely illuminated from any line of sight taken from the chairs in the auditorium.

Fig. 2 shows the proscenium curtain illuminated by the footlights and battens. The organ console is also visible, this, when elevated for use, being illuminated by means of an automatic dimmer controlling the three-colour lighting.

Fig. 2. Astoria Cinema, Southend, showing the illumination of the Proscenium curtains.

In Fig. 3 the main source of illumination in the restaurant is from a large laylight over the well, which is illuminated by means of an architectural strip just visible above the rail. The restaurant proper is lit by means of special ceiling box fittings between the beams.

Astoria Cinema, Folkestone

The lighting of the circle foyer in this cinema is almost entirely indirect by means of a large cove extending practically the whole length of this space. This indirect lighting is supplemented by architectural wall brackets.

The entrance foyer is lighted by an interesting form of indirect lighting, where the fluted nature of the ceiling breaks up the reflected light and practically eliminates any patchiness in lighting, which is sometimes seen where ceilings are of a smooth or flat nature. In addition to the indirect lighting in the entrance foyer, architectural tubes are used for illuminating the posters, etc.

Circular ceiling fittings, one of which can be seen in Fig. 5, light the corridors and staircases throughout the building.

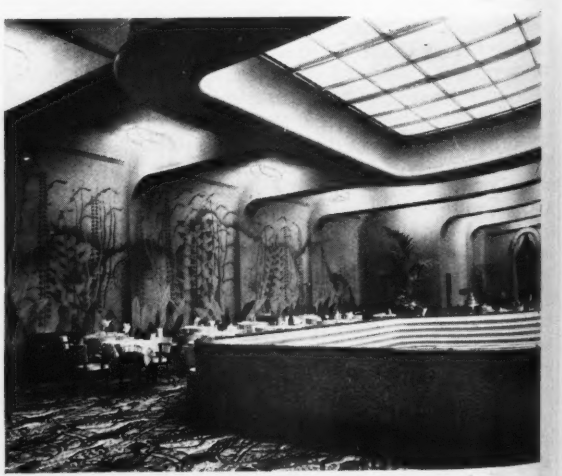


Fig. 3. The Restaurant, Astoria Cinema, Southend.

Fig. 4. Circle Foyer, Astoria Cinema, Folkestone, showing cove lighting.

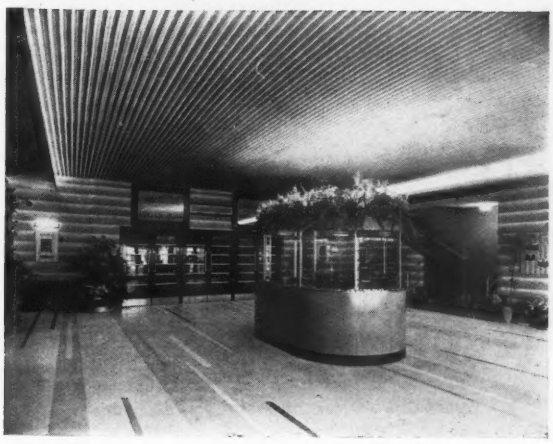


Fig. 5. Entrance Foyer, Astoria Cinema, Folkestone.

"S.S. Brighton"

This installation, though completed some time ago, and scarcely coming under the category of cinemas, is still of considerable interest. "S.S. Brighton" is believed to be the only all-electric swimming pool in the country. The water is warmed by boilers at 11,000 volts, and for purifying purposes the salt water is treated by a special form of violet ray. The pumps throughout the building are operated electrically, and 10,000 lamps are used for illuminating purposes.

Fig. 6 shows the pool illuminated by daylight, but at night the top lights form a laylight which can be used in conjunction with, or alternatively with, a series of spotlights in the roof between the two main laylights. In addition, under-water floodlights are provided, having an illuminating capacity of 100,000 candle-power, and on the control bridge, at the end of the bath, two large floodlights are available for lighting effects.

The control switchboard on the control bridge, which is under the clock seen in the photograph, can operate the various forms of lighting, i.e., floods, spots, laylights, and under-water lighting, either as a combined effect on three-colour dimmer control or alternatively as desired. In other words, the lighting effects are equal to any first-class London stage production.

We are indebted to Major P. A. Smith, managing director of Messrs. Drake and Gorham, Ltd., whose firm carried out these installations to the specification of Major C. H. Bell, O.B.E., for the photographs used to illustrate this article.

Fig. 6. "S.S. Brighton."

Colour Lighting in the Cinema

The following notes are based on a contribution kindly furnished by Mr. R. Gillespie Williams, Colour Lighting Expert to Holophane, Ltd.

COLOUR lighting, as we know it to-day, has been mainly developed during the last decade, and its advance is due to the opportunities which have been offered by and utilised in the cinema.

Stage colour lighting effects on curtains are now a feature of most cinemas, and there are few which do not utilise colour lighting on the screens for the illumination of titles, sub-titles, advertisement slides, etc.

Colour Lighting in the Auditorium.

While rapid progress has been made in the standardisation of stage lighting effects, the use of colour lighting in the auditorium has not advanced so steadily, but has passed through many phases in the past few years. This is to be expected when it is remembered that auditorium decorations and lighting provide greater scope for individual treatment than stage draperies. Opinions also are divided as to what extent colour lighting shall be used in the auditorium.

The development of the cinema stage with its fittings and draperies has been largely influenced by colour lighting. The arts and modes of interior decoration obviously were already established, and one of the difficulties encountered with auditorium colour lighting was that until recently the lighting had to be super-imposed on mural decorations and surroundings not suitable for this new medium of expression.

Decorative colour lighting is a new art and requires new modes and technique in interior decoration and design. It is desirable that more attention should be paid to form and less to colouring by the decorator, for the element of colour is provided by the lighting installation.

A new style of decorative treatment is now in process of evolution, and the cinema is providing the outlet for the development of what promises to be a revolution in decorative art and design.

Lighting as a Decorative Element.

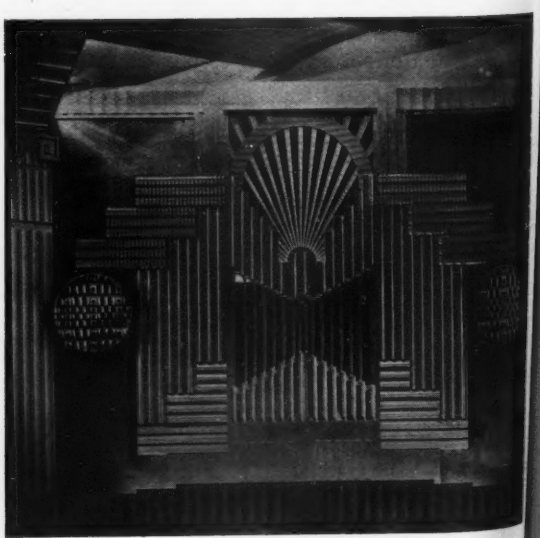
Lighting is apt to be regarded as a mathematical science. This is true of many aspects of illumination with white light, which is normally employed to reveal objects which are already complete in themselves. Colour lighting, however, is being developed on lines which make the lighting an essential constituent of the decorative design and something which governs the nature of the whole. It is, therefore, the implement of the artist rather than the mathematician—the architect, rather than the scientist. A knowledge of illuminating engineering is, however, essential, otherwise proper use cannot be made of the lighting.

Automatic Colour Control.

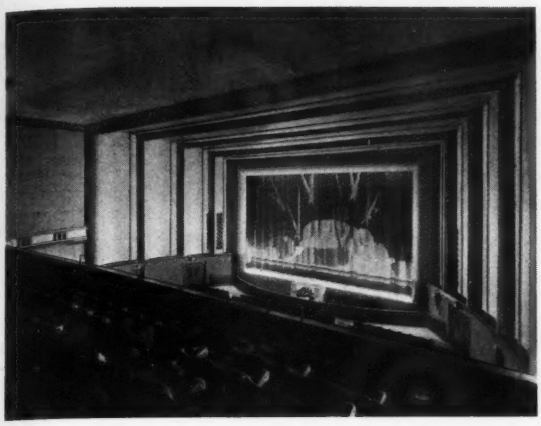
The illustrations accompanying this article show one or two examples of decorative schemes evolved in conjunction with the lighting. In every case, however, one thing is common—the colour changes are manipulated by a semi-automatic system of control, which allow only predetermined combinations of colour hues to be presented by the operator. Colour harmony is a difficult subject and few people called upon to operate lighting installations have an understanding of it. Moreover, the practical difficulties of blending primary colours so as to obtain simultaneously a number of different colour hues are great. Without a method such as the auto-selective system of control, the lighting installations might fail to achieve their purpose and much of their value might be lost.

Readers will be familiar with the fact that modern colour lighting changes are based on the use of three primary colours, red, green, and blue, and that these are mixed in different proportions by varying the intensity of the sources. The three colours must be monochromatic and the mechanism which varies the lighting intensities capable of very fine graduations. Coloured lamps do not provide a range of monochromatic hues, so it is usual to employ ordinary lamps behind colour filters.

There are many types of magazine three-colour or four-colour troughing, depending upon the purpose



Special moulded contour panel for ingenious colour lighting effects installed at Forum Cinema, Wythenshawe, Manchester.



Rialto Cinema, York. A Holophane auto-selective system installation.

to be fulfilled. One major difficulty is the merging of the different colours without overlapping of effect on surfaces immediately adjacent to the lighting equipment.

Relation between Colour and Material.

Stage lighting effects and the apparent number of colour hues, etc., depend upon the relation of sections of lighting equipment to each other, and to the shape, substance, and colour of the materials to be illuminated. It is necessary both on the stage and in the auditorium for the lighting to be considered as an integral part of the whole, and in many ways the most important part.

Colour lighting may be employed not only to change the apparent colours of objects, but to alter the appearance of a design or objects. This feature may be employed either on the stage or in the auditorium, and may be of great value if skilfully applied. The auditorium of the Forum Cinema, Wythenshawe, Manchester, for example, is provided with special wall panels with geometric designs which change in shape and colour with variations of the lighting. The auditorium may thus be changed in appearance from week to week and made to furnish the right atmosphere for each item of the programme.

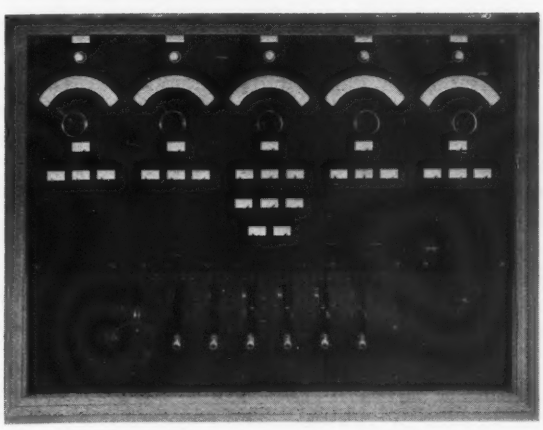
Moulded contour proscenium at Alexandra Cinema, Pontefract.

Capitol Cinema, Didsbury, Manchester, one of the largest and finest colour lighting installations in the country.

Luminous Colour Decoration.

The basic advantage of applied luminous colour for decoration is its infinite flexibility compared with the usual form of mural decorations. The general effect can be changed at will and is capable of endless variation. Of special interest are the possibilities associated with the skilful application of coloured light to patterned surfaces, such as the folds of curtains or walls bearing designs executed in relief, the appearance of which depends on the inclination at which light is received. Closely adjacent areas may thus be illuminated in harmonious contrasting colours. The possibilities in the design of special surfaces in the auditorium with a view to display by changing coloured light have been only imperfectly explored as yet. The position somewhat resembles that found in connection with floodlighting, where so much depends on the design of the façade of a building with a view to its being subsequently thus illuminated.

In conclusion, the value of interludes devoted to changing coloured light as a relief to the eye should not be underestimated. During the display of a film the eye is necessarily subjected to somewhat rapid changes in light and shade. It enjoys, therefore, a welcome rest during the relatively gradual and smooth variations characteristic of displays of coloured light.



View of the switchboard panel of a Holophane selector-controller, the automatic colour lighting control.

This picture of the Gaumont Palace Cinema, Lewisham, illustrates the modern tendency towards lighting that is at once decorative and subdued. Osram architectural tubular lamps are used to advantage. The general effect is soft and pleasing, and the order of brightness such as to bridge the contrast between the darkened auditorium and the daylight outside.

Courtesy : The General Electric Co. Ltd.

Vision in The Cinema Theatre

Must the Auditorium be Darkened?

IN relatively early days of cinema lighting conditions in the entrance hall, corridors, stairways, and auditorium were much discussed. The desirability of creating a gradual transition from the bright daylight outside to the darkened theatre was emphasised. Illumination progressively decreasing as one passed in from the street, traversed the entrance hall and corridors, and approached the room in which the film was shown, was recommended. Diagrams were constructed showing how a moderate illumination might be maintained at the back of the hall and gradually reduced as one approached nearer to the screen. "Grading" of illumination to prevent excessive contrast was then regarded as the ideal, even if, one fears, it was comparatively seldom realised.

In the present days facilities for decorative lighting, including the use of colour, have advanced enormously. Lighting has become much more varied and interesting, and has been skilfully used to create "atmosphere" and prepare the minds of the audience for the film

In one respect, however, there has not been the progress that might have been expected. The idea of preserving the bridge of brightness seems to have been largely abandoned. Films are habitually shown with the theatre almost in complete darkness.

Is this essential for the proper display of films? This is surely doubtful. The contrast between the brightly lighted screen and the adjacent darkness tends to accentuate whatever strain on the eyes exists during a performance. Such severe contrasts are opposed to the conditions shown by photometric researches to be most favourable to vision, i.e., a surround of the same order as brightness, but somewhat less bright than the object examined.* It is at least worth consideration whether most films would not show to better advantage if viewed in a moderately lighted theatre, with a general illumination of the order of, say, 0.5 foot-candles, and with a light-coloured border to the screen so as to diminish the contrast to which the eye is subjected.

It may perhaps be argued that stray light on the screen would impair the picture. The answer is that a moderate diffused illumination of the order specified could be provided without any material amount of light striking the screen; moreover, even if a little light *did* reach the screen, so that contrasts in the picture were slightly softened, this might be no drawback. Contrasts in brightness in films are sometimes unnatural and excessive: on occasion diffused coloured light has been superimposed on a screen picture with good effect.

In one respect a general use of subdued artificial lighting, whilst films are being shown, would be a manifest gain. It would lighten considerably the task of guiding people to their seats, and would render unnecessary, or at least practicable, tests designed to ensure that the weak illumination at present prescribed by authorities is provided. As is well known, a photometric test of very low illuminations—and especially where highly coloured light is employed—presents very considerable difficulties.

* See Lythgoe, Trans., Illum. Eng. Soc. (London), Vol. I., Jan., 1936, p. 5.

A Rapid and Accurate Method of Photometry of Miners' Electric Lamp Bulbs

by

C. B. Platt and H. C. Lister

Legislation was introduced in 1934 by the Mines Department of the Board of Trade, with a view to improving the standard of lighting in coal mines. The Coal Mines General Regulations (Lighting) 1934 now require that only lamp bulbs made to a British Standards or other agreed specification shall be fitted in miners' hand lamps and miners' cap lamps approved by the Department for use by "persons wholly or mainly employed at the working face, at face rippings or at any place where tubs are mechanically filled . . . ." The Regulations specify the tests which are applied with a view to the official approval of such bulbs, that is, type tests of performance to comply with the official specification. Arrangements have also been made whereby subsequent periodical check tests of bulbs selected on the open market ensure that the bulbs supplied to the users are made in strict conformity to the approved specification.

A large amount of photometric work has thus been created by the necessity to test large numbers of bulbs of different makes and different ratings, together with the subsequent check tests, and the development of a rapid and accurate method of photometry has been necessary; the rigidity of the specifications, coupled with the difficulties inherent in the photometry of small lamp bulbs, required accurate and consistent results, but rapidity of measurement was also essential.

The disadvantages of visual methods of photometry are sufficiently familiar to need no description, except to state that the greatest is, probably, the necessity to employ an experienced observer—who, being human, is liable to failure during long periods of routine measurement.

There are a number of methods of photometry in which the photo-electric cell is employed, but all of them fail if the question of the colour response of the cell is not taken into consideration. The time which must elapse for a lamp bulb to "settle down" before measuring it is also a factor where speed of measurement is desirable, for during the measurement of large batches of bulbs, much time is lost while the observer is waiting for each bulb to attain temperature equilibrum.

It was with these three objectives that the instrument presently to be described was designed, in order to measure, without prior adjustment, lamp bulbs having a range of efficiencies of 4.75 lumens per watt to 9 lumens per watt. The design is such, however, that a simple adjustment enables bulbs having efficiencies beyond this range to be measured with equal accuracy.

The Design of the Photometer

(a) Choice of Cell.

Various types and makes of photo-electric cell were tried with a view to combining stability and freedom from the need for skilled supervision, and having an adequate output at the very low levels of illumination available (of the order of 10 to 40 lumens). The cell finally selected was the Weston Model 594 Type 2 Photocell, requiring no energising potential. The cell is used in association with a 12 inch diameter sphere. The current generated by the incidence of light on the cell is led directly to a reflecting type taut-suspension Tinsley galvanometer of 300 ohms resistance, and having an open scale calibrated in lumens.

(b) Control of Output of Cell.

The photo-cell has a colour response approximating to that of the human eye, but it was found that over-sensitivity in the red end of the spectrum caused the measurement of the output of low efficiency bulbs (i.e., bulbs giving a yellowish light) to be too high. This fault was corrected by the use of a Chance Watson Number 5 Green Filter. The filter A, Fig. 1, is fitted in a holder which can be drawn over the face of the cell by a micrometer screw adjustment D, Fig. 1. The light absorption of the filter is such as to give over-correction of the response of that part of the photo-cell which it covers. The proportions of un-corrected and over-corrected cell face were adjusted experimentally until the overall response was sufficiently close to that of the human eye.

In order to obtain and maintain agreement between the magnitude of the flux falling on the photo-cell and the calibration of the micro-ammeter, it was necessary to provide a variable screen B, Fig. 1, sliding over both the face of the cell C, Fig. 1, and

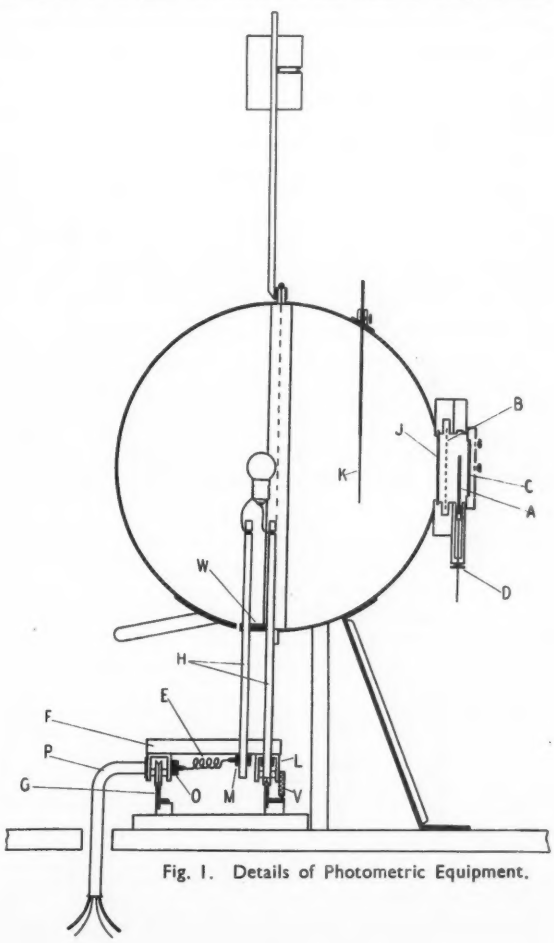


Fig. 1. Details of Photometric Equipment.

the colour filter, controlled by a second micrometer screw adjustment similar to that of the colour filter. By causing the screen to slide in a direction at right-angles to that of the colour filter, disturbance of the ratio of corrected to un-corrected cell surface was avoided—at least over a very large portion of the screen's movement. Since it was considered undesirable, owing to the characteristics of the photo-cell, to have any portion of its sensitive surface completely dark during use, the screen was made from blackened copper gauze of about thirty meshes to the linear inch, but in order to provide the greatest possible range of control, its obstructing power was made progressively greater by providing a second and third layer of gauze over respectively two-thirds and one-third of the surface of the main gauze and set at angles of about twenty degrees to it. This arrangement was found to provide a very fine control of output at low illuminations with the cell almost uncovered, and a greater control at high illuminations when the cell was almost covered by the screen.

(c) Measurement of Lamp Voltage and Current.

The measurement of the voltage applied to the bulb terminals is made by a potentiometer, a potential divider being interposed in order to enable the range of bulb voltages encountered to be adjusted within the scope of the potentiometer. The potential divider consists of five 1,000 ohm manganin coils in series, with the potentiometer connected across the end coil as shown in the circuit diagram. It is thus possible to apply to the potentiometer one half, one third, one fourth or one fifth of the voltage to be measured, according to the number of coils across which this voltage is applied. In series with each bulb under test is placed a closely adjusted 0.1 ohm resistance E, Fig 1, of manganin wire hard-soldered into the ends of short lengths of threaded copper rod of heavy gauge; from these, leads are taken to the potentiometer. The current consumption of the bulb can be determined by measuring the voltage drop in this resistance. Alternatively, this control can be used when measuring bulbs rated at constant current instead of at constant voltage.

(d) Achieving Rapid Operation.

The time required for a miner's lamp bulb to reach a steady output was found to be as much as fifteen minutes from first switching on the current, and is rarely less than five minutes; by connecting six bulbs at once to the supply this serious delay could immediately be reduced to one-sixth of the time per bulb.

(e) Mounting of Bulbs for Measurement.

A movable carrier F, Figs. 1 and 2, is arranged to run on a track G, Figs. 1 and 2, under the photometer sphere to enable the six bulbs to be introduced successively into the sphere. Pairs of copper standards H, Figs. 1 and 2, each standard being fitted with a terminal at its upper end, are placed at suitable intervals

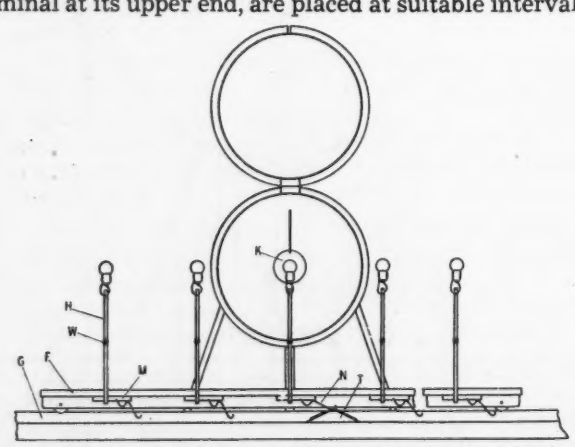


Fig. 2. Showing Method of Mounting for Testing Bulbs.

along this carriage. When the bulbs are attached to these pairs of terminals they are situated in a line passing through the centre of the sphere. Movement of the carriage along its track causes the bulbs to pass in turn through the sphere, one-half of which is hinged and counterpoised to swing vertically, and so permit the successive introduction of the bulbs into the sphere. The internal surface of the sphere is painted with the standard flat white finish; part of the wall of the sphere is replaced by a diffusing glass window J, Fig. 1, behind which is situated the photo-cell and its associated equipment. A small screen K, Figs. 1 and 2, fixed between the bulb and the window, prevents light from falling directly on the window.

A spring-loaded steel ball V, Fig. 1, is mounted on the travelling carriage; the ball engages with notches cut at intervals along the edge of the track, and as the carriage is moved along, the click made by the ball engaging with a notch gives an audible indication that the bulb to be measured is accurately centred in the sphere. The slot cut in the edge of the movable half of the sphere to accommodate the copper standards carrying the bulb is closed during a measurement by the fibre block W, Figs. 1 and 2, mounted on the standards at a suitable height. As a further precaution against the passage of light into the sphere, a broad flange is provided on the edges of the two halves of the sphere, and an internal lip on the moving half covers the joint between it and the fixed half.

(f) Current Supply to Bulbs.

The standards carrying the bulbs are screwed and soldered at their lower ends to copper bars of large cross-section attached to the under-side of the travelling carriage. One of each pair of standards leads directly to a common bus-bar L, Fig. 1, which extends the whole length of the carriage, while the other standard is attached to a short independent length of copper bar M, Fig. 1. Each of these short bars carries a phosphor-bronze wiper arm N, Fig. 2, and a connection to one of the 0.1 ohm resistances previously mentioned. The free ends of these resistances are hard soldered to the second common bus-bar O, Fig. 1, which runs the length of the carriage. Four trailing flexible leads are taken to the carriage through a short guide tube P, Fig. 1, mounted midway along its length, two of the leads being of heavy gauge for current supply and soldered to the mid-points of the bus bars. The other two leads are of lighter gauge, and serve for potential measurement. One lead R is connected to each of the 0.1 ohm resistances, where it is joined to the bus bar O, and the other lead S joins the lower ends of the standards, which are screwed direct into the second bus-bar L.

A phosphor-bronze ramp T, Fig. 2, is situated between the carriage track, so as to make contact with that phosphor-bronze wiper associated with the particular bulb in the photometer sphere. A third potential lead U is taken from this ramp; the voltage applied to the bulb is measured between the leads S and U, and the voltage drop in the 0.1 ohm resistance, which is proportional to the current taken by the bulb, is measured between leads R and U. Errors of operation, due to faulty contacts, are thus eliminated, for there is only one wiping contact employed, and this carries only the current of about 1 milliampere passed by the potential divider.

The desirability of eliminating all variable current-carrying contacts influenced the design of the apparatus in favour of a straight carriage travelling to and fro with trailing leads, as opposed to a continuously rotatable carriage as used by one other laboratory.

A 6-volt 150-ampere-hour capacity accumulator battery is used for the supply, the current from which is fed to the carriage through a system of three rheostats in parallel, as shown in the circuit diagram. The main, or coarse adjustment, rheostat is a heavy

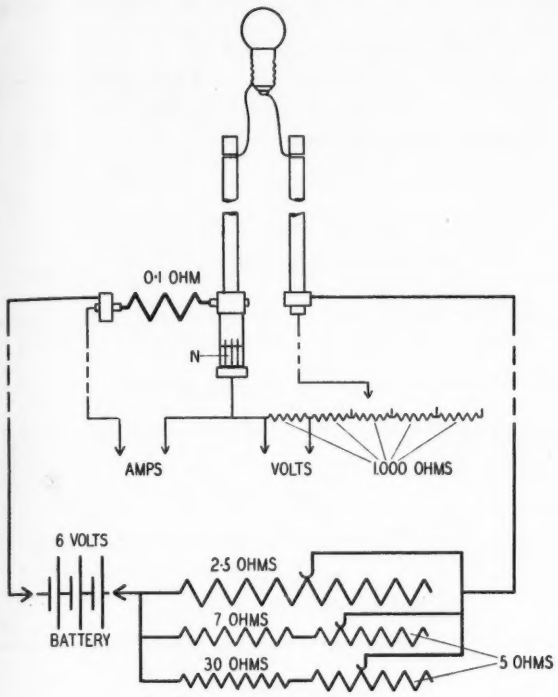


Fig. 3. Circuit Diagram.

duty tubular rheostat of 2.5 ohms total resistance. Medium control is obtained by the use of a robust 5-ohm rotary rheostat in series with a 7-ohm fixed resistance, the two being in parallel with the main rheostat. Fine adjustment is obtained by means of a similar rotary rheostat connected in series with a 30-ohm fixed resistance, these also being connected across the main rheostat. The two fixed resistances ensure that their associated rotary rheostats maintain their functions of medium and fine control for all settings of the main rheostat.

When a set of six bulbs is being adjusted to the rated voltage it is convenient to use an indicating voltmeter for approximate setting before bringing the sensitive potentiometer into operation; the voltmeter is connected in leads S and U through a push-button switch, as this type of switch prevents the voltmeter from being accidentally left in circuit when a balance is being sought with the potentiometer.

(g) Control Panel.

All controls other than the coarse rheostat are assembled for convenience on a single panel. No switches are used at any of the points where circuit interruption or variation is required, since experience has shown that these are eventually a source of trouble; special plugs and sockets of a high efficiency type have been found to be an entirely satisfactory alternative. The three batteries, that is, the main 6-volt battery, the potentiometer driving battery, and the galvanometer lamp battery, are all connected to sockets on the panel. When the batteries are not in use they can be charged by plugging a pair of leads from a permanent battery charger into the appropriate pair of sockets. The voltage on charge or discharge of any battery can be measured by plugging leads from the voltmeter into a pair of miniature sockets adjacent to the main sockets.

The Operation of Measurement.

The bulbs to be measured are provided with 3-inch lengths of 20 s.w.g. tinned copper wire soldered to their contacts, the free ends of these wires being clamped under the terminals on the standards. The current supply leads are plugged into the 6-volt battery sockets and the lamps lit up. With the voltmeter in circuit the coarse rheostat is adjusted to give a reading as close as possible to the bulb's rated voltage. The potentiometer, in conjunction with the potential divider, is then set to a suitable fraction of this voltage, and the final adjustments are made with the two rotary rheostats, the potentiometer being used in place of the voltmeter.

The end bulb on the carriage is then moved into the photometer sphere. The reading is seen to fall gradually as the bulb acquires a steady state of output; when this steady state is obtained the reading is recorded and the remaining five bulbs are then successively measured without further delay.

The photometer has been found to be at least as accurate as a visual photometer fitted with a standard type Lummer-Brodhun head and potentiometer control. The results of periodical inter-checks against a number of other standardising laboratories indicate that the accuracy and the consistency with which measurements can be repeated is even greater than that of the visual method: the consistency of repeat measurements has been found to be of the order of 1-1½ per cent., according to the type of filament in the bulb to be measured.

The following objectives were attained in the design of the photometer:—

(i) The delay occasioned by the need for allowing a bulb to acquire a steady output, after switching on, was greatly reduced, six bulbs being lit and "settled down" simultaneously.

(ii) The total flux of the bulb is, on introduction into the photometer, readable directly and instantaneously on an open scale graduated in lumens.

(iii) The current consumption of the bulb at the rated voltage can be read with potentiometer accuracy at the same time as the luminous flux measurement.

(iv) All operations can take place in full daylight without sacrifice of accuracy.

New Lighting Schemes

Hastings Town Council are to improve the public lighting fittings at Filsham-road and the Marina Estate.

* * *

Five-year contracts for street lighting by gas have been approved for Welshpool (about 116 lamps) and Stirling (about 334 lamps). A seven-year contract is to be adopted by the Brightlingsea Council; about 176 lamps are involved.

* * *

Taunton Town Council propose to spend £2,500 on improving its street lighting.

* * *

Electric lamps are to be installed in Colne-road by Barrowford U.D.C.

* * *

Fulham B.C. are to apply for sanction to borrow £13,050 for improved main-road lighting.

* * *

A scheme for improving the electric street lighting of Bridlington at a cost of £4,500 has been prepared by the borough electrical engineer.

* * *

Hornsey B.C. are to spend £24,600 on improving the street lighting in their district.

* * *

Amongst recent installations involving the use of sodium electric discharge lamps may be mentioned Broadway, Derby, where 90-watt units 25 ft. high at 44-yd. intervals are used, and Neville-street, Cardiff, where lamps are mounted clamped direct to posts 120 ft. apart on one side of the road only. The installation in Derby is stated to comply with Class "D" in the British Standard Specification.

Calculations with Tubular Architectural Lamps

by H. Lingard

In what follows we present, by request, a summary of the contribution by Mr. H. Lingard at the Informal Meeting of the Illuminating Engineering Society, on March 31st, 1936.

As an approximate guide to the length of architectural lamp tubing to employ in order to secure a given illumination level in an interior, the following method has proved itself fairly reliable in practice, when the lamps are installed on the ceiling.

Use the Lumen method of design, treating the lamps as a "general" lighting fitting (totally enclosed diffusing type).

The total lumens required are then ascertained by the formula:—

$$\text{Total Lumens} = \frac{\text{Floor Area} \times \text{Foot-Candles Required} \times \text{Depreciation Factor}}{\text{Coefficient of Utilisation.}}$$

The coefficient of utilisation is derived from the tabulated data in such handbooks as the E.L.M.A. "Illumination Design Data" handbook, where allowance is made for room dimensions, height and type of fittings, and colour of ceiling and walls.

The depreciation factor should be allowed to ensure that the recommended illumination is available under service conditions, a figure of 1.43 being usual, to allow for a depreciation of 30 per cent. between cleaning periods.

Having ascertained the total lumens required in this manner, the total wattage of architectural lamps to be employed may be obtained by deducting 25 per cent. from the efficiency rating of the 40 watt single coiled gas-filled lamp (in order to allow for the lower efficiency inherent in a tubular vacuum lamp). The efficiency so derived works out at approximately 6.5 lumens per watt.

The total wattage required is then obtained by dividing the total lumens required by this figure of 6.5 lumens per watt. Since architectural lamps are not all rated at the same wattage per foot, the best procedure at this point is to refer to a catalogue and decide on which diameter lamp to use (either 30 m/m or 40 m/m). The total length required (in feet) can then be estimated approximately by dividing the total wattage obtained as above by 35 for the 30 m/m diameter lamp and by 60 for the 40 m/m diameter lamp. It should be noted that all the curved lamps and the 500 m/m straight lamp are available in alternative wattages of 40 and 60 in 30 m/m diameter size, and in making the above calculation the 60 watt size only is applicable. The allowance for the 40 watt lamp is, of course, merely an adjustment in direct proportion (divide by 24 and not 35). An example will perhaps serve to make this method clearer.

Suppose we have a room 20 ft. square with a 12 ft. 6 in. ceiling height, the walls being fairly dark and the ceiling very light, and let us assume that an illumination of 5 foot-candles is required on a working plane 2 ft. 6 in. above the floor.

The coefficient of utilisation for the room using general lighting fittings is found, from a suitable handbook, to be 0.26 for a room of these dimensions and colours.

The total lumens required =

$$\frac{\text{Floor Area} \times \text{Foot-Candles} \times \text{Depreciation Factor}}{\text{Coefficient of Utilisation.}}$$

Substituting, we have:—

$$\frac{400 \times 5 \times 1.43}{0.26} = 11{,}000$$

The total wattage required =

$$\frac{\text{Total lumens required}}{6.5} = \frac{11{,}000}{6.5} = 1{,}693$$

and the total feet of 30 m/m diameter tubing (except in 40 watt curved and 500 m/m straight)

$$= \frac{1{,}693}{35} = 48.4 \text{ feet}$$

or using 30 m/m diameter 40 watt curved or 40 watt 500 m/m straight

$$= \frac{1{,}693}{24} = 70.5 \text{ feet}$$

Using the 40 m/m diameter tubing the feet required

$$= \frac{1{,}693}{60} = 28.2 \text{ feet}$$

Cove Lighting Design

The following note is based on a contribution by Mr. C. S. Woodside to the Transactions of the Illuminating Engineering Society (U.S.A.); May, 1936.

In this study Mr. Woodside points out the importance of care in the selection of lighting lamps used for cove-lighting. Discontinuous sources, such as general service lamps, though requiring more space, are somewhat more economical than continuous linear lamps and can be used to produce a higher illumination. But in no case should these lamps be installed in a cove such as that shown in fig. 1 owing

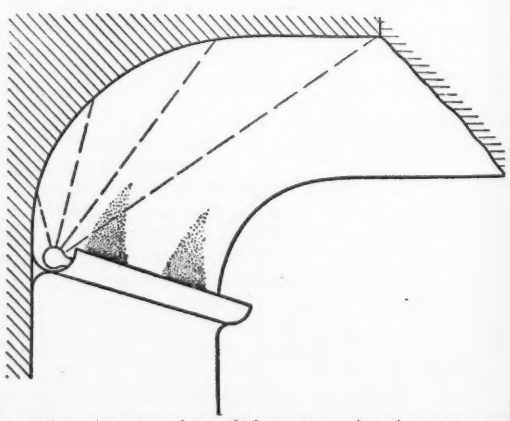


Fig. 1. When this type of cove lighting is employed, a pronounced scalloped effect reveals the location of each lamp.

to the patchy effect resulting. A very uniformly lighted ceiling can, however, be obtained with such lamps on 12 in. or 18 in. spacing if the recessed cove illustrated in fig. 2 is used.

Mr. Woodside worked out a typical calculation, on lines similar to that described by Mr. Lingard (see first column). A well designed installation with a porcelain enamel reflector will have an efficiency of about 70 per cent. In the typical case of a room 14 ft.

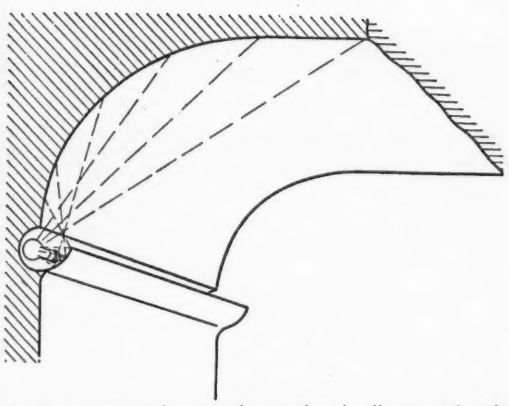


Fig. 2. By recessing the trough a uniformly illuminated ceiling is produced.

wide and 20 ft. long, assuming a coefficient of utilisation of 0.25, he shows that 60 watt lamps spaced on 18 in. centres in a continuous trough on each of the longer sides of the room should yield approximately 17 foot-candles on the working plane.

Light Advertises A Viennese Restaurant

by Hans Koch

Some effective form of luminous device, easily visible at a great distance, was recently required to advertise a terrace-restaurant situated on the roof of a very high building in Vienna. Ordinary methods were ruled out by special circumstances. For instance, the fact of the roof-restaurant being built almost entirely of glass, rendered flood-lighting of no value—quite apart from the fact that during the summer the terraces are thronged by people, who would be dazzled by the light. A letter-sign of the requisite size presented constructional difficulties, and the effect of wind pressure was also a serious consideration Further, the cost of installation of a neon sign of the requisite dimensions appeared prohibitive, and the brightness insufficient for a position so high and so distant.

Finally a relatively cheap and very effective solution was found in the erection of three powerful beacons, casting their beams in three distinct directions over the city. These fittings are stationed on the roof of the restaurant, in positions somewhat set back from three of the four corners, so that there is no danger of those using the restaurant being dazzled by the light. At the same time the powerful lights are easily visible from streets and squares, and thus have the desired effect of attracting attention from a distance.

In view of their high efficiency, mercury vapour electric discharge lamps were adopted. The unusual blue-green colour of the light enhances the advertisement. The lamps are mounted vertically in metal reflectors of approximately parabolic section. The following particulars of these units may be of interest:—

Consumption (including that of choker)	1,000 watts.
Starting Pressure	220 volts.
Operating Pressure	135 volts.
Operating Current	8 amps.
Light Output (Hefner Lumens)	55,000 H.F. Lns.

The intense heat developed renders adequate ventilation and weatherproof construction of the fittings in their exposed position essential.

The chokers and other accessories for the lighting units are mounted together inside the building, so as to be under cover and protected from rain. In order to avoid damage to the lamps through excess of current in the event of defects in the chokers, a double pole 10 amp. fuse is provided for each unit.

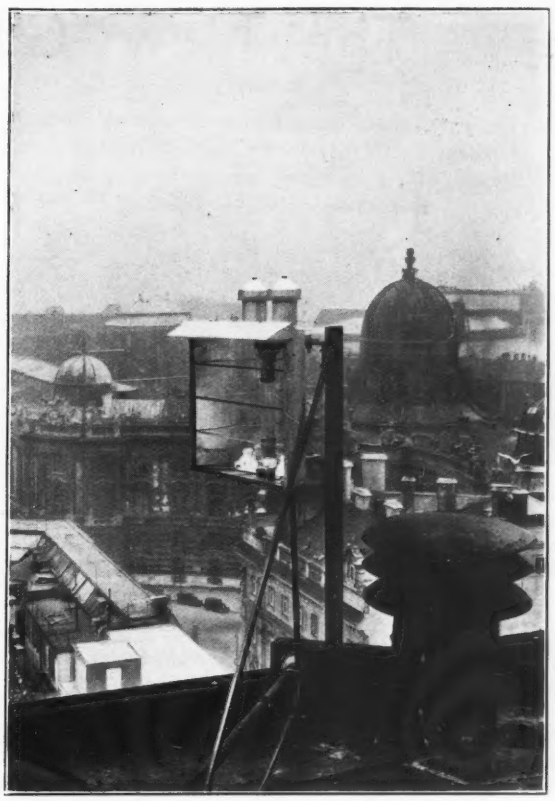


Fig. 1. Showing one of the beacons on the roof of the "Hochhaus" in Vienna.

Apart from their main object of advertising the restaurant the mercury lamps flood the surroundings with light. Thus, in the evening, visitors to the restaurant have a pleasing view of the old palaces, houses, and courtyards in the centre of the town, apparently bathed in bright moonlight.

Fig. 2. A back view of the beacon, which is visible from afar and at the same time illuminates the buildings in the vicinity.

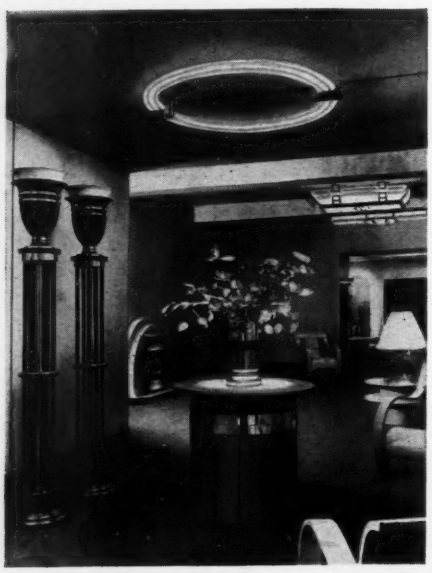
The New G.E.C. Showrooms

The introduction of neon interior lighting effects. A newly designed entrance hall and lounge.—A display of architectural lamps.—New examples of modern decorative lighting.

THE spacious showrooms of the G.E.C. at Magnet House, Kingsway, have always been models of their kind, combining utility with artistry and appealing alike to the practical electrician, the architect, the consultant, the builder, and their clients. A comprehensive scheme to remodel these showrooms has recently been completed, and serves to enhance their appeal at the present time.

The entrance to the new showrooms gives a first impression of spaciousness and brightness, achieved by the ingenious use of large mirrors, with only a few carefully chosen lighting fittings. In this hall there are twelve specially designed lighting features, all arranged to make the best use of architectural lamps. This is a new departure in the design of fittings, and the combination of these lamps with new kinds of red, peach, green, and yellow coloured glass produces a wide variety of lighting effects, which are enhanced by the new and unusual colours produced by this glass and the various satin silver, brushed copper, chromium and cellulose finished metals employed.

The lighting of the two large wall mirrors is carried out in a new way by a surround of architectural



Reflection of the Lounge in a mirror gives illusion of a long vista.

lamps. This idea of surrounding mirrors with lamps is interesting and gives a pleasing effect. Elsewhere, shaving mirrors with similar illuminated surrounds are shown, a somewhat revolutionary practice, as it has always been the accepted principle that the maximum brightness should be concentrated on the object to be viewed—in this case, clearly the reflection of one's face. Too much light around the mirror might tend to distract one's attention from the reflection, but a softly illuminated surround is certainly effective.

In the new showrooms for domestic cookers, some of the effects to be obtained from interior neon lighting are well displayed. In the cornice of this room are fitted two Cleora tubes (blue and green) and one

Modern decorative lighting shown in a variety of forms.

clear red neon tube. (Cleora is a G.E.C. patented process, which consists of utilising fluorescent materials for producing a wide range of colours with a high lighting efficiency). These three tubes are controlled by dimmer switches in such a way that a very wide range of colours can be produced.

People are, even now, apt to assume that, except in very special circumstances and for purely decorative purposes, the low efficiency of neon tubes in relation to their capital cost and expense of maintenance, precludes them from being regarded as a serious rival to incandescent lamp lighting.

Recent research, however, has materially modified the position, and to-day the peculiar advantages which neon tube lighting possesses for a variety of illumination purposes are available at a cost comparable with that of many other forms of decorative lighting.

Such advantages are particularly noticeable in visible tube and indirect colour-mixing installations,

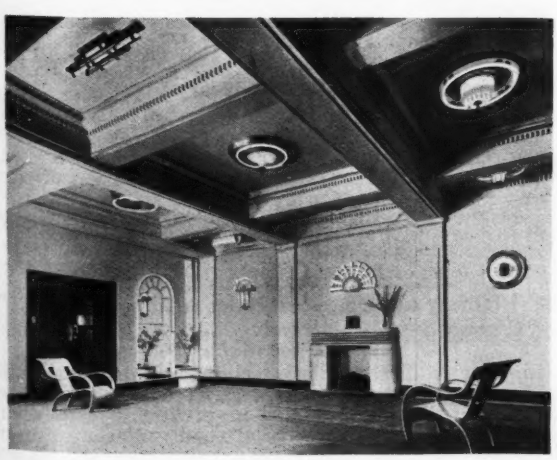
A pleasing combination of central pendants, special devices on walls.

Enclosed ceiling units and wall brackets with illuminated shaving mirrors.

but that neon tubes can also be employed in a most effective way behind decorative glassware in the form of laylights, glazed cornices, decorative glazed units or wall panels is demonstrated very convincingly in these new showrooms.

The three triple tube visible units in the ceiling, each consisting of one large diameter Cleora green tube and on each side a smaller red tube of opal glass, give a very pleasing resultant lighting, quite free from glare, which is suitable for restaurants, hotels, cinemas, offices, and, in fact, almost any installation.

Further examples of the wide application of neon interior lighting are shown in the lounge and the showroom used for displaying refrigerators. A rich mellow effect is obtained in the lounge from a combination of gold and pink Cleora tubes and in two types of decorative fittings. The visible unit consists of a semi-circle of three of these tubes placed against a large mirror, which forms practically one side of the room, and these give a striking illusion



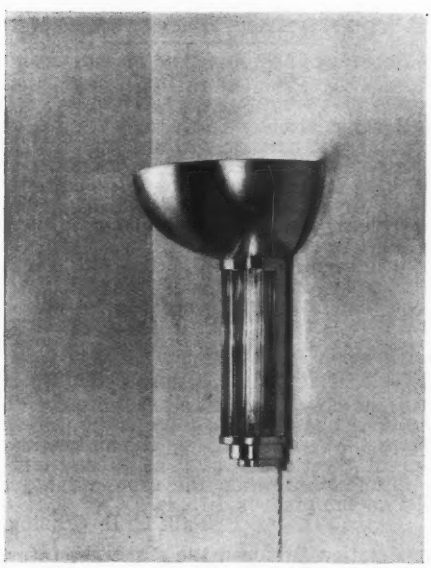
General view of the architectural lamp room.

General view of kitchen showing the new neon lighting.

of a complete circle of light. The mirror itself creates the illusion of a continuous vista and gives a remarkable sense of space.

It is interesting to note that in the refrigerator room a very cold effect has been obtained by further clever use of Cleora tube lights in the form of two glazed troughs on either side of the beam and a flush laylight.

The remainder of the showrooms are filled with hundreds of examples of the most modern lighting



Chromium or satin silver wall bracket with champagne or pink glass rod for striplites.

practice. The architectural room contains some very fine lighting units, again carefully arranged to enable them to be considered without distraction. This room is quite different from anything else in the showrooms, in that it shows many forms of lighting which are incorporated in the actual structure of the building.

The Jacobean room forms an excellent setting for a large number of Jacobean, wrought iron, Flemish, and other types of period fittings.

We recommend all who are concerned in any way with electric lighting installations to inspect these showrooms of the G.E.C. Their contents are as alluring as they are instructive and can hardly fail to help in solving many of the illumination problems with which lighting specialists are from time to time confronted.

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

(Continued from July, Page 217)

I.—RADIATION AND GENERAL PHYSICS.

174. Effect of Temperature on the Kerr Effect in Nitrobenzol.

F. Gabler and P. Sokob. Z.T.P., 17, 6, pp. 196-201, June, 1936.

The effect was investigated between the temperature range, 12° C. to 111° C., and the results correlated with theory. W. R. S.

175. The Kerr (electro-optical) Effect in Ammonia Gas, Nitrogen, and Oxygen.

Anon. R.G.E., 39, pp. 927-928, June 27, 1936.

An abstract of an article in "The Physical Review," Vol. 48, pp. 237-240, August 1, 1936. W. R. S.

176. Photoelectric Compensation of Potentials and Measurement of Resistance.

Phys. Zeits., 8, p. 269, April, 1936.

With the aid of photo-resistance or photo-e.m.f. cells, and a Wheatstone bridge circuit, small resistances and small potentials (up to 300mV.) can be measured. Such circuits are here described and their accuracy discussed. It is possible to design a circuit which requires no auxiliary e.m.f.—though a standard lamp or illumination seems to be called for. T. H. H.

II.—PHOTOMETRY.

177. The Accuracy of Photometric Measurements.

J. Hordlicka. Proc. Ninth Int. Congress of Photog., Paris, 1935.

The author has already shown that the probable value of a series of photometric measurements evaluated by plotting curves of the frequency of errors is very little different from the arithmetic mean. The work is now extended to the case where the two fields are of slightly different colour, due, for example, to two lamps of slightly different colour temperature. In this case there is a marked dissymmetry in the curves of errors and the arithmetic mean does not coincide with the probable value, but it is sufficiently near to be substituted in practice. F. J. C. B. (Photog. Abs.).

178. Photographic Photometry.

H. Kienle. Naturwiss, 23, pp. 759-762, 1935.

The assignation of a scale to intensities of blackening produced on a photographic plate can be of value only when the method of determining the intensities is stated. The different effect on the plate of intermittent and continuous illumination when the same total quantity of light falls on the plate is discussed.

F. J. C. B. (Photog. Abs.).

179. The Relation Between the Apparent Intensity of a Beam of Light and the Angle at which the Beam Strikes the Retina.

W. D. Wright and J. H. Nelson. Proc. Phys. Soc., p. 401, May, 1936.

The observation made recently by Stiles and Crawford that the efficiency of a pencil of light was much greater when it passed through the centre of the lens of the eye than when it traversed an outer segment has been confirmed. Suggestions to account for this phenomenon are put forward: it is probably associated with the angle at which the light is incident on the retina, which may have an inherent directional sensitivity. Any reasons for such directional sensitivity are at present only guesses. S. E.

III.—SOURCES OF LIGHT.

180. A New Illuminant for Use with the Process Camera.

F. J. Tritton. Proc. Engr. Monthly, 42, pp. 309-313, 1935.

The Osira mercury vapour lamp is described. This lamp, which can only be used on alternating current, gives very steady illumination after fifteen minutes' running. When exposing with ordinary emulsions it is at least as efficient as a 7 amp. enclosed arc. A mercury-cadmium lamp of the same type was also tested, and it was found that the quantity of red light emitted was very slight from the photographic point of view.

F. J. C. B. (Photog. Abs.).

181. A Second Sheath near the Cathode of an Arc Discharge.

N. Warmolty. Nature, 138, p. 36, July 4, 1936.

During investigations of arc discharges with heated oxide-coated axial, cylindrical cathodes in rare gases, a new dark sheath with a sharp boundary was seen between the well-known Langmuir double-space dark sheath surrounding the cathode and the light of the arc plasma. The existence and characteristics of this new dark sheath depend on the nature and pressure of the gas and on the magnitude of the discharge current density. T. H. H.

182. Progress in the Manufacture and Application of High-pressure Mercury Lamps.

E. Summerer. Das Licht, 82, May, 1936.

Progress in the technical details of the mercury high-pressure lamp is best shown by the following abbreviated table, of which the sections refer to the years 1933 and 1936.

Mercury high-pressure lamp:—

Type.	Watts consumed by *lamp.*	Hefner Lumen *output.*	*H. Lumens* watt (lamp only).
1933.			
Hg H.1000	250 ...	10,000 ...	40
Hg H.2000	500 ...	20,000 ...	40
1936.			
Hg H. 500	140 ...	5,500 ...	39
Hg H.1000	265 ...	11,000 ...	42
Hg H.2000	450 ...	22,000 ...	49

The German 150-watt mercury lamp is enclosed within the spherical bulb ordinarily used for the filament 300-watt lamp. The mean life of these lamps is said to be 2,000 hours. S. E.

183. Obtain Coloured Light by Fluorescence.

Anon. El. World, 106, p. 1,812, June 6, 1936.

The production of coloured tubular lamps by the use of fluorescent materials as a coating to low-pressure mercury vapour lamps is described. S. S. B.

IV.—LIGHTING EQUIPMENT.

184. The Characteristics of a "Study Lamp" recommended by "l'Association des Ingénieurs de l'Eclairage."

M. Leblanc. R.G.E., 39, pp. 909-911, June 20, 1936.

An account of a lamp similar in design to the "Study Lamp" now popular in America and England. W. R. S.

185. Remote Control Plan for Library Lighting.

Ralph E. Jones. El. World, 106, p. 1,814, June 6, 1936.

The author describes a remote control system for library lighting, with master and individual controls, which can be used to provide group operation of stack lights during the daytime and individual operation of these lights at night. S. S. B.

V.—APPLICATIONS OF LIGHT.

186. Highway Lighting—Principles and Sources.

Cromwell A. B. Halvorson. Elect. Engineering, 55, pp. 735-746, June, 1936.

Linking the first studies of highway lighting with the present studies, the author enumerates some aspects of the optical problem involved in producing satisfactory levels of brightness on typical road surfaces to insure adequate visibility under various weather conditions. Characteristics of incandescent, sodium vapour and high-intensity mercury vapour lamps are discussed, together

with the design of fittings, mounting heights and spacings necessary to provide optimum conditions for vision. The paper presents a concise review of the data that forms the basis of current American practice. S. S. B.

187. Better Visibility Needed on Highways at Night.
L. A. S. Wood. Elect. Engineering, 55, pp. 614-618, June, 1936.

The author stresses the great need for adequate highway lighting to prevent accidents at night, and demands that this field should be studied very widely and carefully. He illustrates by photographs how much more effective proper highway lighting is than reliance upon car headlights (which is stated to be scientifically unsound), especially when the road is wet. The part played by silhouette in discernment is explained. The need for continuity in quality of lighting demands State control, and the expense could be met out of existing car taxation. S. S. B.

188. Street Lighting.
Anon. Electn., 116, pp. 781-2, June 12, 1936.

A discussion is given on pole positioning, with particular regard to bends of roads and intersections. C. A. M.

189. Electric Street Lighting.
P. J. Robinson and J. N. Waite. Electn., 116, pp. 765-772, June 12, 1936.

Present-day street-lighting practice is discussed in detail by the authors in a paper to the I.M.E.A. Economic aspects are considered. C. A. M.

190. Lighting Load de Luxe.
Anon. El. World, 106, pp. 1,909-1,911, 1,974, June 20, 1936.

Details are given of the lighting of the Hershey windowless office building. Most of the lighting is by indirect units, combining a 750-watt incandescent lamp with a 300-watt mercury vapour tube. A special unit has been installed in the board room, and decorative incandescent cove lighting in the main lobby. Full particulars, with photographs, are given. S. S. B.

191. Post Office Lighting.
Anon. Electn., 116, p. 791, June 12, 1936.

A brief description, with a photograph, is given of a new lighting installation in a post office in Cornwall. Prismatic panel-type ceiling units are used. Illumination values obtained are 25 fc. at the counter and 18 fc. over the remainder of the office. C. A. M.

192. Stage Lighting Effects.
Anon. Electn., 116, pp. 702-3, May 29, 1936.

A brief description is given, with photographs, of the development of the control of stage lighting effects by the console method. C. A. M.

193. Lighting at Aldershot Tattoo.
Anon. El. Times, 89, p. 869, June 18, 1936.

A short account, with photograph, of some of the spectacular lighting used for the Aldershot Tattoo. W. R. S.

194. Photography with Polarised Light with the Eastman Pola Screen.
J. W. McFarlane. Proc. Ninth Int. Congress of Photog., Paris, 1935.

Various examples of the practical use of the Pola screen are given, including the control of sky density, photographing through shop windows, photography of paintings, etc., and pictures behind glass, photography of metallic objects, glass and glazed pottery, etc.
F. J. C. B. (Photog. Abs.).

195. Submarine Light and Its Biological Importance.
Nature, 137, p. 1,066, June 27, 1936.

It is reported that at the 1936 meeting of the International Council for the Exploration of the Sea, a special session was devoted to "Submarine Daylight, its Measurement and Biological Effects." Messrs. Angstrom, W. R. Atkins, Clarke, Pettersson, Poole, and Utterback were appointed as a special committee for working out proposals for instruments, methods of measurement, and choice of units. T. H. H.

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 447,103. "Improvements in or Relating to Illuminated Display Apparatus."

Sanders, E. A., and Stinson, C. A. R., October 29, 1935.

According to this specification a display apparatus comprises a transparent or translucent screen bearing a legend, a picture or the like, an elongated or strip-like source disposed behind the screen, and a cylindrical lens between the screen and the light source to project and distribute light from the source upon the screen. The cylindrical lens may be a hollow vessel filled with liquid. The light source may be disposed in a groove formed in the rear part of the lens and parallel to the lens axis. A reflector may be placed behind the light source.

No. 447,466. "Improvements in Miners' and Like Safety Lamps."

Hailwood, E. A., November 13, 1934. (*Divided from No.* 447,406.)

In order to facilitate the observation of the flame, the wick tube of a safety lamp is surrounded by a sleeve which carries a matt-surfaced unperforated plate projecting parallel with the flame. The sleeve and plate may be raised and lowered by means of a rod extending through the oil container and projecting from the bottom of the lamp. The raising of the sleeve gradually reduces the size of the flame until indications by the flame of the presence of gas, in a mine, for example, may be observed against the background of the plate.

No. 446,882. "Improvements in or Relating to Lighting Equipment and the Arrangement Thereof in Enclosures or Vehicles."

Patent Licence Corporation, February 2, 1935. (*Convention, U.S.A.*)

This specification relates to the securing of good light distribution in enclosures, such as public vehicles, to enable a number of persons to read easily when located close to one another as in vehicle seats, and to avoid shadows upon the matter being read. Over each seating area an illuminating source is provided, which directs downwardly a diverging beam which does not include or fall upon the upper portion of the body of a person seated in either of the adjacent seating areas. The light beams of two adjacent sources intersect each other to provide a highly luminous shadowless reading zone between the seating positions. The angle of divergence of the beam of each source is such that the direct light from the source is not visible to persons in the normal seating positions. The sources may have light-diffusing sides to provide for general illumination. Particular constructions of fittings are described and illustrated.

No. 447,808. "Improvements in or Relating to Shades for Electric Light Sources.

Vereinigte Lausiter Glaswerke Aktiengesellschaft and Lorschy, H., June 9, 1934. (*Convention, Germany.*)

This specification describes a shade for electric light sources having a downwardly directed reflector of which the mouth or base is partly closed by a horizontal transparent annulus. A hollow conical frustum is joined to the inner edge of the annulus by its smaller end, a transparent, short, hollow conical frustum of smaller base angle, but pointing in the same direction, is joined by its larger end with the larger end of the first-mentioned frustum in a re-entrant fashion and the upper edge of a translucent hollow member is joined to the upper edge of the second-mentioned frustum, the lower portion of this hollow member being substantially coplanar with the bases of the first and second frustums. The first frustum may be wholly or partly transparent or translucent and may be covered by interchangeable rings of translucent material.

No. 447,863. "A Direction Stabilising Device for Motor Car Lamps."

Pierron, J. H. J., August 30, 1934. (*Convention, France.*)

The object of this specification is the mounting of headlamps of a vehicle in such a manner that the direction of the beam is unaffected by rocking or pitching of the car due to irregularities of the road surface. The headlamps are tiltably mounted on the chassis and are connected by a link with the centre of gravity of, or the middle part of, a rod which is connected to the front and rear wheel mountings of the vehicle. The rod has such elasticity and such inertia that its middle portion remains parallel to the road surface independently of the shocks caused by irregularities of the road surface and independently of variation of the load on the vehicle.

In the specific arrangement described, the link is connected at one end with a lever attached to horizontally-pivoted headlamps, and at the other end is connected with a second lever fulcrummed to the chassis. This second lever is coupled with a rod, which is connected to the wheel mountings, by means of a bush which is slidable on the rod and longitudinally movable with regard to the second lever.

No. 447,864. "Improvements in or Relating to Reflectors, More Particularly for Road Lighting."

N. V. Philips Gloeilampenfabrieken, September 10, 1934. (*Convention, Holland.*)

This specification covers a reflector which is symmetrical with respect to two planes and is especially suitable for lighting a surface of elongated shape, such as that of a road, in conjunction with a concentrated source of light. Portions of the reflecting surface adjacent the opening of the reflector, for lighting the most remote portions of the surface, are parts of paraboloids of revolution of which the axes make comparatively small angles with the plane of the reflector opening, while the intermediate portion of the reflector is formed by a surface generated by the rotation of two parabolic lines along arcs, which intersect each other at an angle smaller than 180°. The foci of the paraboloids coincide with the axis of the reflector and the centres of the arcs, along which the parabolic lines are rotated, are located near the common focus of the paraboloids of revolution and are symmetrical with respect to the reflector axis. The light source may be located in or near the reflector axis between the common focus of the paraboloids and the reflector surface.

Retirement of Mr. S. B. Langlands

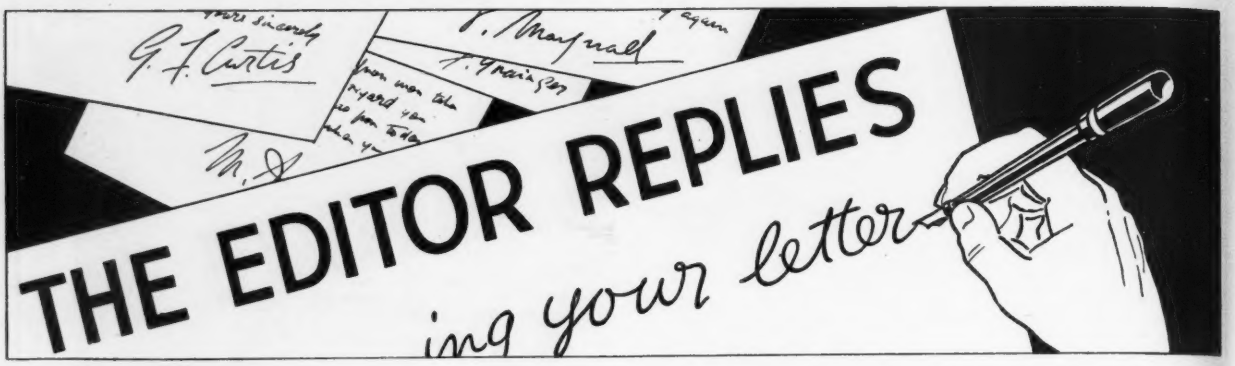
The retirement of Mr. S. B. Langlands, after thirty-two years of service as Public Lighting Engineer of the City of Glasgow, is an event of great interest to all concerned with street lighting. Mr. Langlands has come to fill a unique position in this field, as our oldest and most experienced public lighting engineer, satisfying, in a remarkable degree, the requirements of this exacting position. His retirement is a real loss to the City of Glasgow Corporation. Fortunately, he has a very worthy successor in Mr. E. J. Stewart, who enters on his new position with the good wishes of many friends.

Throughout this long period as public lighting engineer—and the still longer period of fifty years in the public service generally—Mr. Langlands has not merely discharged his technical duties with distinction. We should be disposed to rate at least equally highly his efforts to raise the status of public lighting, and his work in training others to carry on the good work. His own public lighting department, the first of its kind, has shown the way to others. Young men trained in his laboratory have taken a leading part as public lighting engineers in other cities.

His genial and sagacious personality has gained him many friends both in the Association of Public Lighting Engineers, which he was largely instrumental in founding, and in the Illuminating Engineering Society, of which he is a vice-president. He has never spared himself in the service of either body. One incident during the International Illumination Congress in 1931 which many of us remember with pleasure was the welcome, on arrival at

Mr. S. B. Langlands

Glasgow, by Mrs. and Mrs. Langlands—equipped with banners! Readers will join us in wishing them both every happiness for years to come.



The Question arises . . .

Questions do arise, even in summer, though fewer may be expected during July and August.

We have had some further views expressed on **plastic materials for lighting fittings.** We are assured that some of the most recently developed materials are more durable than the note in our last issue might suggest—that the surfaces, though naturally less hard than glass are not easily scratched and the material is quite unaffected by the variations in temperature likely to be met with in ordinary interiors.

This last suggestion may well be true. One gathers that the question of effects of temperature is most likely to arise in the case of fittings in which insufficient allowance for heat generated by the adjacent lamps is made. Somewhat more generous allowance is doubtless necessary. As regards durability of surface, well—time will show.

The little comment we made some time ago on the **public lighting of Stockport** has drawn a letter from a well-informed quarter. From this we gather that Stockport has *not* a full-time Public Lighting Engineer. We agree that it is high time that all towns of this size had a properly qualified expert, whose sole job it would be to attend to the lighting of their streets.

With reference to the note on **"The Science of Seeing"** in our last issue (p. 215), a correspondent who has been present at some of the E.L.M.A. Conferences and greatly enjoyed them, recalls a recent visit of opticians, at which the familiar tests of opinion in regard to necessary reading illumination were conducted.

On this occasion, apparently, the majority of those present (who, as opticians, doubtless attached full weight to visual needs) voted for **20 foot-candles**—a somewhat lower value than has sometimes been recorded. We think, however, that most people will agree that anyone who habitually receives 20 foot-candles for reading purposes does not do at all badly—indeed, if only half this quantity were universal in offices and factories it would be a tremendous advance.

We have been asked whether, as a general rule, it is expedient to provide **a choice of values of illumination,** such as is afforded, for example, by the American practice of introducing in the same bulb several filaments of different power, which can be used either separately or in combination.

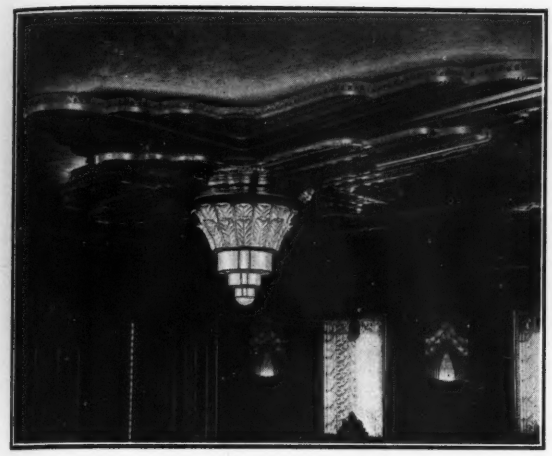
Whilst we have an open mind on this point, we hardly think such procedure is necessary in this country, where "super illuminations" are not very usual. (We are here speaking, of course, of fittings furnishing working illumination, not those which may have to serve two distinct purposes, such as the fittings in the ward of a hospital.) We should, however, recommend that any arrangement giving, say, 100 foot-candles, ought to be so designed as to enable alternative lower values to be obtained if desired.

Can any reader give us the name and address of the makers of the **"Alzac" reflectors?** We have been able to answer inquiries in regard to several others, but this particular make seems to have eluded us.

A somewhat unusual inquiry recently came our way. It referred to the **culmination of the moon,** an event which occurred in astronomically favourable circumstances in April last.

Our attention was drawn to a reference to this phenomenon in the daily Press, and to the alleged existence of **"flash" of the moon,** visible only at the instant of culmination. The effect was described as striking—"almost as though one were seeing the headlights of a distant motor-car and then suddenly got one's eye in the exact focus of the headlamp reflector."

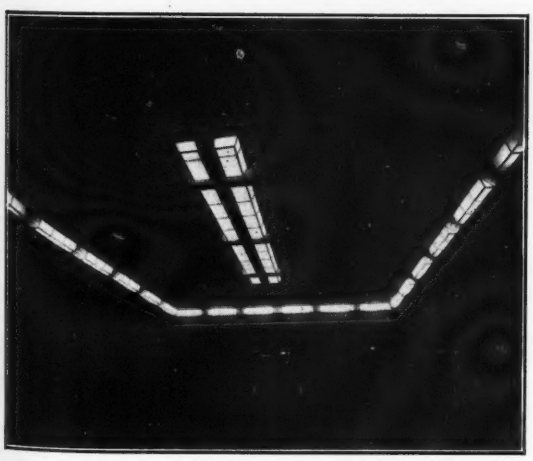
The idea is a fascinating one—to illuminating engineers it would naturally be interesting to know how the moon was able to floodlight the earth so strongly at that particular moment. Unfortunately, an appeal to the Royal Astronomical Society brought the assurance—on no less authority than that of the Astronomer Royal—that the suggestion is "a piece of journalistic nonsense." Another illusion shattered!



A pleasing Ceiling Fitting in the Troxy Cinema

Cinema Lighting

We are indebted for the two pleasing illustrations here shown, to Messrs. Falk, Stadelmann and Co., Ltd., who have been responsible for the lighting of many theatres throughout the country, and are familiar with the problem of designing the lighting so as to harmonise with the surroundings and create the desired "atmosphere." Most installations of this kind involve close co-operation between the architect and the technical lighting expert. In general, the method of lighting should not be too conspicuous and, indeed, subdued, and subservient to the general decorative scheme—though, as these two illustrations show, opportunities for introducing architectural lighting effects are frequent in cinemas.



Architectural Lighting in King George V. Hall, G.P.O.

PERSONAL

We learn from Mr. A. W. Beuttell, who is well known to readers as the President of the Illuminating Engineering Society, but is also Governing Director of Linolite, Ltd., that Mr. L. A. Fickling, the manager of that company, has now transferred his services to Belling & Co. Mr. Fickling has been with the company for nine years, but is now to act as Sales Engineer for East London and the County of Essex. The active control of the company has been taken over by Mr. Beuttell, who will be assisted by his son, Mr. Victor F. Beuttell.

TRADE NOTES AND NEWS

B.T.-H. Rugby Works

Visit of E.C.A. Members

On June 24 about seventy members of the E.C.A. (Western section) visited the chief works of the British Thomson-Houston Co., Ltd., at Rugby. The visitors were afforded an opportunity of seeing all the chief lines of manufacture, and some time was spent in the research laboratory, where a glimpse was obtained of the work being done in the development of Mazda Mercra electric discharge lamps, "Thyratrons," photo-electric cells, etc.

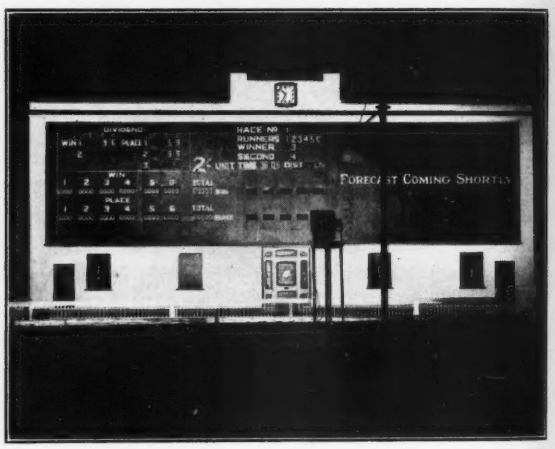
It is interesting to note that since the first B.T.-H. workshops were opened in Rugby in May, 1901, the population of the town has grown from 11,000 to 35,000. About 8,000 people are now employed in these works, which consist of eighty-one buildings. and utilise about six miles of railway track within their area, on which are operated locomotives and runabout cranes, and a large fleet of self-propelled petrol and electric trucks facilitates the transport of goods. Incidentally, the works use annually for manufacturing purposes nineteen millions of units of electricity—and an even larger number of cubic feet of gas!

A South African Order

The above photograph, taken outside the works of Benjamin Electric, Ltd., shows the despatch of a large consignment of Benjamin industrial lighting fittings for South Africa. The consignment included well over 1,000 reflectors, mainly Saaflux Glassteel Diffusers for the new Firestone Rubber Company's factory at Port Elizabeth.

A Floodlighted Tote

An up-to-date example of modern floodlighting is now to be seen at the Romford greyhound track, where the totalisator has been floodlighted with Royal "Ediswan" "Escura" electric discharge



lamps in Ediswan "Sirius H" projectors. This new lighting has been a great improvement, and it is now possible to see the board from any part of the arena. The installation was carried out by Messrs. Leggatt and Partners, of Romford.

Improved Gas Lighting in Chelsea

The Chelsea Borough Council has entered into a 15-year agreement for the lighting by gas of thirteen main traffic routes and the side streets throughout the borough. Contemplated improvements include the raising of the standard of lighting of all main traffic routes to comply with the report of the M.O.T. Departmental Committee on Street Lighting, the conversion of all 2-light to 3-light lamps, and the fitting of special reflectors. The illumination in all side streets will be doubled. Other London boroughs which have entered into 15-year agreements for gas lighting are Westminster, Holborn, Paddington, and Southall-Norwood.

Contracts Closed

BRITISH THOMSON-HOUSTON CO., LTD.

War Office—For the supply of Mazda lamps for the twelve months ending May 31, 1937.

County Borough of South Shields—For the supply of Mazda lamps during the next six months.

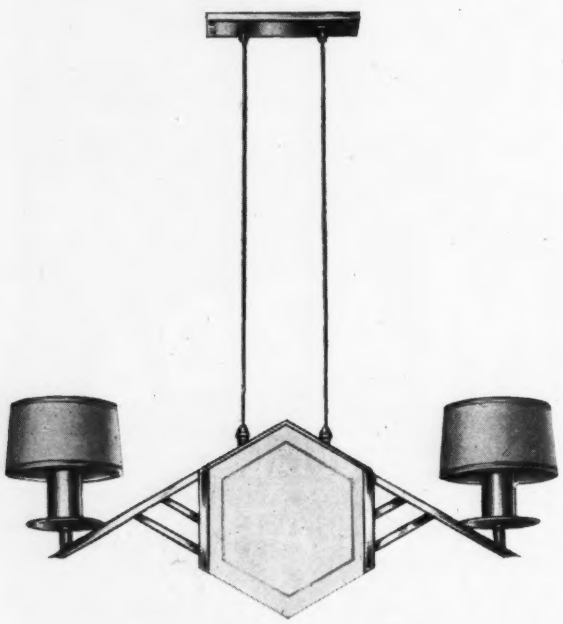
SIEMENS ELECTRIC LAMPS AND SUPPLIES, LTD.

Ayr County Council—For the supply of Siemens' electric lamps over a period of twelve months.

The "Junior Alpine Sun"

A few months ago members of the Illuminating Engineering Society had a chance of hearing something about the uses of ultra-violet radiation in analysis, and of seeing some very striking demonstrations of its use to excite fluorescence. Little was said about the use of such radiation in medicine, but a glimpse into these possibilities is obtained by a study of *The Quartz Lamp*, a quarterly record of actinotherapy issued by Hanovia, Ltd., one of the firms who took a leading part in connection with the display mentioned above. The variety of affections that can be thus treated is very considerable—after studying these leaflets, a reader will know what to do if he happens to suffer from, shall we say, telangiectasis? He will also learn something of the use to which such radiation is being put in building up general health in school clinics, at Bournville and elsewhere. Of special interest, because of its convenient design, is the "Junior Alpine Sun" equipment developed by Hanovia, Ltd. This compact quartz lamp and reflector, with all necessary accessories, can be packed into a portable case and applied to any a.c. voltage circuit from 200 to 250 volts.

A Pleasing Bedroom Fitting



The above fitting, of novel design, is one amongst many pleasing types on view during the recent visit of the Press to the G.E.C. showrooms at Magnet House. It is specially designed for the dressing table. The two side-lights serve to illuminate the person using the mirror, whilst the central hexagonal piece directs light downwards on to the table itself.

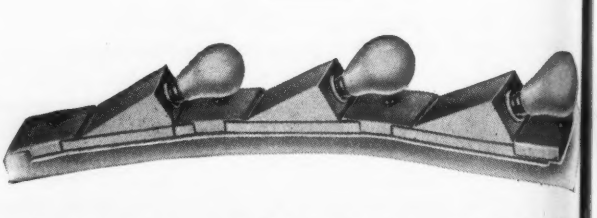
"Corbelux" Cornice Strip

The Corbelux Cornice Strip shown on the right is a product of Harcourt, Ltd., and presents several substantial advantages. It can be used in either straights or curves, all units being interchangeable. Any size of lamps from 15 to 100 watts can be used. Ample space is provided for wiring, which cannot be damaged during assembly.

Novel Counter Lighting at the Army and Navy Stores

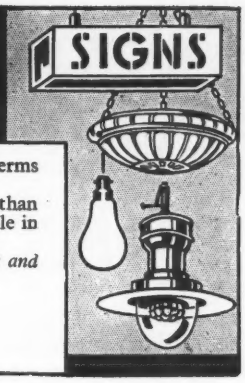
We are indebted to Messrs. Harcourt, Ltd., for the accompanying illustration showing a novel method of lighting sales counters at the Army and Navy Stores (London) by special trough units. These continuous metal troughs are equipped with 40 watt

lamps on 18 in. centres, and are lined with hammered mirror glass. The trough is deeply skirted, but in order to eliminate any possibility of glare in the eyes of customers, longitudinal louvres are fitted the whole length of the trough, and secondary louvres transversely between each lamp. A very high order of illumination is thus obtained with comparatively low wattage lamps.



This Corbelux Cornice Strip is used to advantage in lighting the Astoria Cinema, Southend (See p. 234).

WHERE TO BUY
A DIRECTORY OF LIGHTING EQUIPMENT



We invite applications for spaces in this new section of the journal. Particulars of terms for each space (approx. 1 inch deep and 3⅛ inches wide) are given below.

These terms are equivalent to **half our ordinary advertising rates**, but not less than 12 successive monthly insertions can be accepted on this basis, and amounts are payable in advance.

Payment for an advertisement in this section entitles the advertiser to receive *Light and Lighting* during the period of the contract.

Terms:					
12	Successive	Monthly	Insertions	£3 10 0	Payable
24	,,	,,	,,	£6 0 0	in
36	,,	,,	,,	£8 10 0	Advance

1

MODERN LIGHTING FITTINGS

New Catalogue on application

Fittings manufactured to Architects' Specifications

ASCOG LIMITED

Ascog House, 44, Theobalds Road, LONDON, W.C.1

2

PHOTOMETERS

for testing candle-power and illumination. Benches, Cubes, Heads, Standards of Light, Special Fittings and Accessories.

ALEXANDER WRIGHT & CO., LTD.,
1, Westminster Palace Gardens, Artillery Row, Victoria St., London, S.W.1

3

ALLOM BROTHERS LTD.
16, GROSVENOR PLACE, LONDON, S.W.1.

Specialists in the Science of Modern Lighting, including:

Theatres and Public Halls. Tennis and Racquet Courts.
Pictures and Picture Galleries. Floodlighting, etc.
Decorative Fittings in Glass and Metal.

4

MODERN LIGHTING SPECIALIST CONTRACTING

LEONARD J. BEARD
& CONSULTING ENGINEER
524, HIGH ROAD, LEYTONSTONE, E.11

'PHONES: LEY. 3015
NIGHT SERVICE LEY. 1203

5

Take no risks— specify

BENJAMIN
PLANNED LIGHTING
THE BENJAMIN ELECTRIC, Ltd., TARIFF ROAD, N.17

6

MAZDA LAMPS and B T H LIGHTING EQUIPMENT

Our Illuminating Engineers will be pleased to advise you on any street or floodlighting problem

THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2

7

BROMFORD
Seamless Steel Lighting Standards
for all requirements
ROMFORD TUBE CO., LTD., ASTON, BIRMINGHAM

8

BOOKS

PLEASE send for Detailed list of Books on Illuminating Engineering and allied subjects, post free, from:

CHAPMAN & HALL, Ltd., 11, Henrietta St., London, W.C.2

9

THE REINFORCED CONCRETE LAMP COLUMNS SPECIALISTS.
CONCRETE UTILITIES, Ltd.
WARE, Herts.

10

DAWSON REFLECTORS
Indoor and Outdoor Floodlights
JENA REFLECTOR FITTINGS
Miss E. H. DAWSON & HENCKEL,
42, Gray's Inn Rd., London, W.C.1
Telephone: Chancery 7751/2

11

Specialists in
ARCHITECTURAL ILLUMINATION AND DESIGNS
DRAKE & GORHAM LTD.
36, GROSVENOR GARDENS, LONDON, S.W.1
Manchester, Glasgow, Hereford and Winchester.

12

ELECTRICITY SERVICES LTD.
Sole Proprietors and Patentees of the "ALL PURPOSES"
TYPERLITE LOCAL LIGHTING UNITS
86, Cannon St., LONDON, E.C.4
Mansion House 5294 (3 lines)

13

"ESLA"
BI-MULTI AND MULTIPLANE REFLECTORS
Lanterns, Brackets, Columns, Switch and Fuse Boxes, etc., FOR STREET LIGHTING
The Electric Street Lighting Apparatus Co.
The Foundry, Canterbury

14

ELM WORKS, LTD.
Established 1903 Summerstown, London, S.W.17
Suspension Lamps, Lanterns, **REFLECTORS** for **PUBLIC & INDUSTRIAL LIGHTING**
GAS and ELECTRIC
VITREOUS ENAMELLING Sheet Metal Work, Metal Spinning, &c.

Index to "Where to Buy"

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 255-258.)

WANTS: We shall be glad to hear of the Wants of Readers in the way of lamps, fittings and special apparatus—almost all of which could probably be satisfied by one or other of the firms above whose entries appear in "Where to Buy" (pp. 255-258).

Catalogues and Advertising Literature

We invite all firms in the Lighting Industry to send us new catalogues as they appear, for reference in these columns.

LIGHTING TRADES, LTD. (17-19, Farringdon-road, E.C.1). New Catalogue of Lighting Fittings (No. 305).

REVO ELECTRIC, LTD. (Tipton). Catalogue of Lighting Equipment (250 pages).

MAGNA WIRE AND CABLE CO., LTD. (136, Borough High-street, London, S.E.1), Hellux Street Lighting Equipment (Illustrated Catalogue).

RADIOVISOR PARENT, LTD. (28, Little Russel-street, London, W.C.1). Smoke Alarm Equipment (Descriptive Leaflet).

DERNIER AND HAMLYN, LTD. (23, Newman-street, London, W.1). "Neolux" Lighting Fittings (Illustrated Catalogue).

L. G. HAWKINS, LTD. (30-35, Drury-lane, London, W.C.2). "Supreme" Lighting Fittings (Illustrated Leaflet).

KNIGHTSHADES, LTD. (Derby-road Works, Edmonton, London, N.18). Table Lamps and Other Lighting Fittings (Catalogue, Printed in Colour).

ADAM HILGER, LTD. (98, King's-road, Camden-road, London, N.W.1). The Spekker Photoelectric Absorbtiometer (Descriptive Leaflet).

BRITISH COMMERCIAL GAS ASSOCIATION (28, Grosvenor-gardens, London, S.W.1). Indoor Recreations—Domestic Science Classrooms (Illustrated Leaflets).

NEW GAS LIGHTING CONTRACTS IN LONDON

As evidence of the work that is constantly going on to improve London's street lighting, it may be pointed out that lighting authorities in the Greater London area made no fewer than 16 new contracts during 1935 with one gas undertaking alone. These contracts were for periods varying from five years up to fifteen years, and in most cases specified definite improvements in the lighting installations. In all some 8,000 gas lamps are affected by them.

Among these recent agreements, that made by the Southall-Norwood U.D.C. is of interest, for this makes the fourth important London authority since 1932 to sign a 15-year contract for gas lighting. The others are Westminster, Holborn and Paddington.

Another recent contract of interest is the 5-year agreement entered into by the Brentwood U.D.C. The contract specifies gas entirely. Half a mile of the High Street is to be lighted in accordance with Classification 'D' of the British Standard Specification, and four miles of main roads will comply with Classification 'F.' Lamps on other stretches of main road and on all side roads are to be increased in candle power and the number of lamps employed will be very largely increased.

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